10.1071/AH21129
Australian Health Review

Supplementary Material

Characteristics of patients aged 50–74 years with a request for an immunochemical faecal occult blood test in the Australian general practice setting

Allan Pollack[A] (*FRACS (Orth), Medical Data Analyst/Epidemiologist*), Doreen Busingye[A,*] (*PhD, Epidemiologist*), Jill Thistlethwaite[A] (*FRACGP, Medical Advisor)*, Suzanne Blogg[A] (*MPH, Manager Health Intelligence*) and Kendal Chidwick[A] (*MSc, Senior Epidemiologist*)

[A]NPS MedicineWise, Sydney, NSW 2010, Australia

*Correspondence to: Email: busingyedoreen@gmail.com

Stepwise process to assign each patient to a single FOBT sub-group

To ensure that patients were reasonably assigned to the relevant FOBT sub-groups, an exploration of various data fields, including laboratory names associated with the text strings for the FOBT results, was performed at each stage of the selection process. After eligible patients for the study population and study period were identified, these were assigned to six mutually exclusive sub-groups, in priority order of the sequence in Table S1.

Table S1. Sequence and text string for identifying FOBT-subgroups

Priority order	FOBT sub-group	Definition and text string
1	GP-requested FOBT[A]	Patient has at least one record of the text string 'FOB', or of ('FAECAL' and 'OCCULT') in the 'REQUESTED_TESTS' field/variable of the Pathology Request data table
2	NBCSP FOBT	Patient has at least one record of the text string 'IFOBT GP' in the 'RESULT_NAME' field of the Pathology Results data table
3	Private FOBT[B]	Patient has at least one record of the text string 'FAECAL IMMUNOCHEMICAL' in the 'RESULT_NAME' field of the Pathology Results data table
4	Other FOBT[C]	Patient has at least one other FOBT result identified with text string ['FOB' and not('VIRTUAL' or 'INFOBIOTIN')] or ['FAECAL' and ('HAEM' or 'IMMUNOCHEM')], in the 'RESULT_NAME' field of the Pathology Results data table
5	Colonoscopy only	Patient has any record ever of colonoscopy or colonography or sigmoidoscopy
6	No FOBT or colonoscopy	Patient has no record of FOBT or colonoscopy

[A] Note that the assignment of patients to the 'GP-requested FOBT' group was based only on the presence of at least one appropriate FOBT request, and was independent of any FOBT results that the patient had, or even if there had been no FOBT results recorded. Once the patient was in the 'GP-requested FOBT' group, all their FOBT results were assessed as part of the 'GP-requested FOBT' group, because of the difficulty in determining the source. The FOBT results were relevant for the sub-analysis on outcomes, that is diagnoses or referrals recorded following the FOBT result.

[B] Once all the patients in the 'GP-requested FOBT' group were excluded, and then all the patients in the NBCSP group (as determined by at least one record of the text string 'IFOBT GP' in the pathology results) were excluded, then only those remaining patients who had at least one record of 'FAECAL IMMUNOCHEMICAL' in the pathology results were assigned to the 'Private FOBT' group.

[C] Once all the patients in the 'GP-requested FOBT' group, 'NBCSP FOBT' group and 'Private FOBT' group were excluded, then only those remaining patients who had at least one record of '['FOB' and not('VIRTUAL' or 'INFOBIOTIN')] or ['FAECAL' and ('HAEM' or 'IMMUNOCHEM')]' in the pathology results were assigned to the 'Other FOBT' group.

Table S2. Search criteria to define symptomatic and at risk patients with missing reason for requests with a relevant symptom or indicator recorded in the 90 days prior to FOBT

Relevant symptom/indicator	**Definition**
Defining symptomatic patients	
Anaemia	Patients were defined as having anaemia if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields and/or a result meeting modified WHO serum haemoglobin (Hb) thresholds recorded in the pathology atom results table during the study period. Relevant terms included anaemia/anemia or anaemic/anemic. The WHO thresholds for anaemia were modified as below: - females with a haemoglobin ≥ 120 g/L and males with a haemoglobin ≥ 130 g/L were categorised as not being anaemic - females with a haemoglobin 110–119 g/L and males with a haemoglobin 110–129 g/L were categorised as being mildly anaemic - females and males with a haemoglobin ≤ 109 g/L were categorised as being moderately to severely anaemic
Gastrointestinal bleeding[A]	Patients were defined as having gastrointestinal bleeding, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the diagnosis fields. Relevant terms included: blood in stool, black or tarry stool, haematochezia, rectal bleeding, melaena.
Gastrointestinal symptoms (other)	Patients were defined as having gastrointestinal symptoms, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the diagnosis fields. Relevant terms included: abdominal pain, bloating, diarrhoea, constipation, change in bowel movements, anal or rectal pain, anal or rectal lump.
Defining at risk patients	
Family history of bowel cancer	Patients were defined as having family history of bowel cancer, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the diagnosis fields. Relevant terms included: terms for bowel cancer (e.g., bowel cancer, colorectal cancer, CRC, colon cancer, rectal cancer) in combination with family history, mother, father etc.

Relevant symptom/indicator	Definition
Hereditary non-polyposis colorectal cancer (HNPCC; Lynch syndrome)	Patients were defined as having hereditary non-polyposis colorectal cancer, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the diagnosis fields. Relevant terms included: hereditary non-polyposis colorectal cancer, HNPCC, Lynch syndrome.
Familial adenomatous polyposis (FAP)	Patients were defined as having familial adenomatous polyposis, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the diagnosis fields. Relevant terms included: familial adenomatous polyposis, FAP.

[A] Although an FOBT is not indicated if gastrointestinal bleeding or melaena is already confirmed, these conditions were recorded by GPs for some patients in the 90 days prior to FOBT. This might relate to the investigation of patient reported, or suspected, gastrointestinal bleeding or melaena.

Table S3. Relevant clinical conditions recorded after FOBT result

Condition	Definition
Bowel cancer	Patients were defined as having bowel cancer, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields. Relevant terms included: bowel cancer (or other cancer synonyms e.g. tumour, malignant, metastasis, carcinoma, sarcoma, lymphoma), colorectal cancer, CRC, colon cancer, rectal cancer.
Polyps	Patients were defined as having polyps, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields. Relevant terms included: polyp (in combination with bowel, colorectal, colon, rectal).
Haemorrhoids	Patients were defined as having haemorrhoids, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields. Relevant terms included: haemorrhoid, piles.
Relevant cancer	Patients were defined as having relevant cancer, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields. Relevant terms included: adenocarcinoma, gastric or intestinal metastasis (cancer, tumour, malignant, lymphoma), and leiomyosarcoma.
Inflammatory gastrointestinal conditions	Patients were defined as having inflammatory gastrointestinal conditions, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields. Relevant terms included: Crohn’s disease, ulcerative colitis, IBD, gastritis, peptic ulcer disease, and diverticular bleeding.
Vascular gastrointestinal conditions	Patients were defined as having vascular gastrointestinal conditions, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields. Relevant terms included: angiodysplasia, venous ectasia, variceal bleeding, hemangioma, gastric antral vascular ectasia, Dieulafoy's lesion, and medication related GI bleeding.

Condition	Definition
Infectious gastrointestinal conditions	Patients were defined as having infectious gastrointestinal conditions, if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the three diagnosis fields. Relevant terms included: Salmonella or typhoid, enteroinvasive and enterohemorrhagic Escherichia coli, Shigella, Neisseria, Yersinia, tuberculosis, Campylobacter, and Strongyloides.

Table S4. Sociodemographic characteristics and risk factor definitions

	Definition
Sociodemographic characteristics	
Age	5-year age groups: 50–54, 55–59, 60–64, 65–69, 70–74. Age was calculated at 1 July 2019 based on the patient's date of birth (defined as 1 July in the patient's year of birth) and presented as mean, median and 5-year age groups. Valid age was defined as 0–112 years.
Sex	As recorded in the clinical information system (CIS): Male, Female
State in Australia	State was assigned based on each patient's postcode of residence. If the patient's residence postcode was missing, the practice location postcode was used as a proxy.
Remoteness	Remoteness was assigned based on a mapping of each patient's postcode of residence using the Australian Bureau of Statistics (ABS) mapping of Postcode 2016 to the Australian Statistical Geography Standard (ASGS) Remoteness Areas.
Socioeconomic status (SEIFA)	Socio-Economic Indexes for Areas (SEIFA) was assigned based on a mapping of each patient's postcode of residence using the Australian Bureau of Statistics (ABS) mapping of Postcode 2016 to the Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD).
Risk factor	
Alcohol status	Alcohol status was based on the patients' current alcohol status recorded in the CIS: Less harm, More harm (> 10 drinks per week, or > 4 drinks per day).
Smoking status	Smoking status was based on the patients' current smoking status recorded in the CIS: Current smoker, ex-smoker, non-smoker, unknown.

	Definition
Body mass index (BMI) category	BMI was based on the patients' BMI or height and weight recorded closest to the index date (provided the height was recorded after age 18 for women and 22 for men) Underweight (< 18.5 kg/m^2) Healthy weight range (18.5–< 25 kg/m^2) Overweight (25–< 30 kg/m^2) Obese (≥ 30 kg/m^2) Not recorded

Table S5. Frequency distribution of sociodemographic characteristics for the general study population, 'GP-requested FOBT', 'NBCSP FOBT', 'private FOBT' and 'no FOBT or colonoscopy' sub-populations

Characteristic	General study population		GP-requested FOBT sub-population		NBCSP FOBT sub-population		Private FOBT sub-population		Sub-population with no FOBT or colonoscopy	
	Number	% (95% CI)	Number	% (95% CI)	Number	% (95% CI)	Number	% (95% CI)	Number	% (95% CI)
Total	683,625	100	45,771	100	144,986	100	1,590	100	428,648	100
Sex										
Male	312,814	45.8 (45.2-46.4)	21,381	46.7 (45.3-48.1)	62,997	43.5 (42.7-44.2)	662	41.6 (37.1-46.1)	199,578	46.6 (46.0-47.1)
Female	370,811	54.2 (53.6-54.8)	24,390	53.3 (51.9-54.7)	81,989	56.5 (55.8-57.3)	928	58.4 (53.9-62.9)	229,070	53.4 (52.9-54.0)
Age group (years)										
50–54	141,479	20.7 (20.1-21.3)	9,697	21.2 (20.3-22.0)	19,302	13.3 (12.8-13.8)	231	14.5 (12.5-16.5)	102,856	24.0 (23.4-24.6)
55–59	147,006	21.5 (21.1-21.9)	10,736	23.5 (22.8-24.1)	23,264	16.0 (15.6-16.4)	251	15.8 (13.7-17.9)	100,123	23.4 (23.0-23.7)
60–64	140,275	20.5 (20.3-20.7)	9,508	20.8 (20.4-21.2)	31,988	22.1 (21.7-22.4)	274	17.2 (15.3-19.2)	85,540	20.0 (19.8-20.2)
65–69	132,230	19.3 (19.0-19.7)	8,726	19.1 (18.5-19.6)	36,133	24.9 (24.5-25.3)	373	23.5 (21.0-25.9)	73,649	17.2 (16.9-17.5)
70–74	122,635	17.9 (17.3-18.6)	7,104	15.5 (14.5-16.6)	34,299	23.7 (23.0-24.3)	461	29.0 (26.1-31.9)	66,480	15.5 (14.9-16.1)
State/Territory										
ACT	14,895	2.2 (0.5-3.9)	598	1.3 (0.3-2.3)	3,867	2.7 (0.4-4.9)	116	7.3 (0.0-15.6)	9,263	2.2 (0.6-3.8)
NSW	244,800	35.8 (30.6-41.0)	22,198	48.5 (41.2-55.8)	51,584	35.6 (30.1-41.0)	744	46.8 (34.2-59.3)	148,182	34.6 (29.3-39.8)
NT	8,022	1.2 (0.2-2.1)	285	0.6 (0.0-1.3)	448	0.3 (0.0-0.6)	0	0.0 (0.0-0.0)	6,461	1.5 (0.3-2.7)
QLD	116,947	17.1 (13.2-21.0)	5,520	12.1 (8.1-16.0)	24,810	17.1 (13.0-21.2)	129	8.1 (3.1-13.2)	73,242	17.1 (13.1-21.1)
SA	22,665	3.3 (1.5-5.1)	2,011	4.4 (1.5-7.2)	6,148	4.2 (1.8-6.6)	148	9.3 (0.3-18.3)	12,996	3.0 (1.4-4.7)
TAS	56,862	8.3 (4.9-11.8)	986	2.2 (0.7-3.6)	14,481	10.0 (5.8-14.2)	46	2.9 (0.2-5.6)	34,928	8.1 (4.7-11.6)
VIC	147,157	21.5 (15.6-27.4)	11,438	25.0 (17.5-32.4)	28,741	19.8 (14.8-24.8)	305	19.2 (6.9-31.5)	93,541	21.8 (15.1-28.5)
WA	72,277	10.6 (7.0-14.2)	2,735	6.0 (3.2-8.7)	14,907	10.3 (6.6-13.9)	102	6.4 (1.3-11.5)	50,035	11.7 (7.6-15.7)
Remoteness										
Major city	392,790	57.7 (52.0-63.4)	26,885	59.0 (50.9-67.0)	84,590	58.5 (52.9-64.1)	894	56.4 (43.8-69.1)	245,134	57.5 (51.5-63.5)
Inner regional	188,882	27.8 (23.0-32.5)	13,198	28.9 (22.4-35.5)	41,583	28.8 (23.7-33.8)	459	29.0 (17.6-40.4)	115,596	27.1 (22.3-31.9)

Characteristic	General study population		GP-requested FOBT sub-population		NBCSP FOBT sub-population		Private FOBT sub-population		Sub-population with no FOBT or colonoscopy	
	Number	% (95% CI)	Number	% (95% CI)	Number	% (95% CI)	Number	% (95% CI)	Number	% (95% CI)
Outer regional	87,592	12.9 (9.9-15.8)	4,887	10.7 (6.7-14.7)	17,056	11.8 (8.8-14.8)	164	10.4 (4.7-16.0)	57,332	13.4 (10.3-16.6)
Remote/very remote	11,196	1.6 (0.8-2.5)	633	1.4 (0.1-2.6)	1,328	0.9 (0.3-1.5)	67	4.2 (0.0-12.3)	8,289	1.9 (1.0-2.9)
Missing	3,165		168		429		6		2,297	
IRSAD quintile										
1 (most disadvantaged)	119,768	17.6 (14.6-20.7)	7,109	15.6 (12.0-19.2)	24,013	16.6 (13.2-20.1)	281	17.8 (7.5-28.2)	77,248	18.2 (15.2-21.2)
2	127,467	18.8 (15.8-21.7)	10,812	23.8 (19.6-27.9)	25,238	17.5 (14.7-20.3)	236	15.0 (9.4-20.6)	80,323	18.9 (15.7-22.1)
3	170,616	25.1 (21.8-28.5)	12,700	27.9 (23.4-32.4)	37,301	25.8 (22.0-29.7)	317	20.1 (12.3-28.0)	105,481	24.8 (21.5-28.1)
4	127,800	18.8 (16.5-21.2)	8,112	17.8 (14.8-20.8)	26,862	18.6 (16.0-21.2)	236	15.0 (9.5-20.4)	80,064	18.8 (16.5-21.2)
5 (most advantaged)	133,139	19.6 (16.2-23.0)	6,786	14.9 (11.5-18.3)	30,894	21.4 (17.4-25.4)	505	32.1 (21.7-42.4)	82,015	19.3 (15.9-22.7)
Missing	4,835		252		678		15		3,517	

FOBT: Faecal occult blood test; GP: General practitioner; IRSAD: Index of Relative Socio-Economic Advantage and Disadvantage; NBCSP: National Bowel Cancer Screening Program.
Note: Two of the six FOBT sub-populations, 'Other FOBT' (n=14,158) and 'Colonoscopy only' (n=48,472), are not presented in this Table.

Table S6. Number of relevant conditions [A] per patient in the 6 months post-FOBT result, in each of the 'GP-requested FOBT request with test result' and 'NBCSP FOBT' restricted sub-populations, 1 January 2018 to 30 June 2019

Number of relevant conditions [A] per patient	**GP-requested FOBT request with first test result recorded 1/1/18–30/6/19 (N = 22,618 patients)**		**NBCSP FOBT sub-population with first test result recorded 1/1/18–30/6/19 (N = 104,259 patients)**	
	Number of patients	% (95% CI)	Number of patients	% (95% CI)
0	21,578	95.4 (94.9-95.9)	101,488	97.3 (97.2-97.5)
1	938	4.2 (3.7-4.6)	2,571	2.5 (2.3-2.6)
2	94	0.4 (0.3-0.5)	192	0.2 (0.2-0.2)
3	<8	0.0 (0.0-0.0)	8	0.0 (0.0-0.0)
4	<5	0.0 (0.0-0.0)	0	0.0 (0.0-0.0)

[A] The 7 relevant conditions are: 'Colorectal malignancy', 'Polyp', 'Haemorrhoids', 'Other GIT malignancy', 'GIT inflammatory condition', 'GIT vascular condition', 'GIT infection'.

FOBT: Faecal occult blood test; GP: General practitioner; NBCSP: National Bowel Cancer Screening Program; GIT: Gastrointestinal tract.

Note: '<8' and '<5' presented to preserve confidentiality.