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Clinicians' opinions on recommending aspirin to prevent colorectal cancer to Australians aged 50 to 70 years: a qualitative study

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3	1	Clinicians' opinions on recommending aspirin to prevent colorectal cancer
4 5	2	to Australians aged 50 to 70 years: a qualitative study
6	3	
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34 Abstract

35 Objectives

36 Australian guidelines recommend all 50 to 70-year-olds without existing contraindications consider

taking low-dose aspirin (100 mg - 300 mg per day) for at least 2.5 years to reduce their risk of
developing colorectal cancer.

We aimed to explore clinicians' attitudes, practices, knowledge, opinions, and barriers and facilitatorsto the implementation of these new guidelines.

41 Methods

42 Semi-structured interviews were conducted with clinicians to whom the new guidelines may be

- 43 applicable (familial cancer clinic staff (geneticists, oncologists and genetic counsellors),
- 44 gastroenterologists, pharmacists, and general practitioners (GPs)).

The Consolidated Framework for Implementation Research (CFIR) underpinned the development of
 the interview guide. Coding was inductive and themes were developed through consensus between the

47 authors.

48 Emerging themes were mapped onto the CFIR domains: characteristics of the intervention, outer
 49 setting, inner setting, individual characteristics and process.

50 Results

Sixty-four interviews were completed between March and October 2019. Aspirin was viewed as a safe and cheap option for cancer prevention. GPs were considered by all clinicians as the most important health professionals for implementation of the guidelines. Cancer Council Australia, as a trusted organisation, was an important facilitator to guideline adoption. Uncertainty about aspirin dosage and perceived strength of the evidence, precise wording of the recommendation, previous changes to guidelines about aspirin, and conflicting findings from trials in older populations were barriers to implementation.

58 Conclusion

59 Widespread adoption of these new guidelines could be an important strategy to reduce the incidence 60 of bowel cancer, but this will require more active implementation strategies focused on primary care 61 and the wider community.

62 Strengths and limitations of this study

63 Up to five short bullet points, no longer than one sentence each, that relate specifically to the methods.64 They should not include the results of the study.

- We recruited a large and diverse group of participants representing different clinical disciplines, varied length of experience, and work settings.
 - We applied an established theoretical framework to study guideline implementation
 - We recruited participants only from one state, Victoria, but we believe our findings are likely to be transferable to other Australian clinicians
 - We acknowledge that there may be other barriers and facilitators experienced by clinicians from remote locations.

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Introduction

In 2019, colorectal cancer (CRC) was the second most commonly diagnosed cancer in Australia in men and women (9,069 cases and 7,329 cases, respectively).¹ In November 2017, Cancer Council Australia updated their guidelines for the prevention of CRC to recommend that all people aged 50-70 who are at average risk of CRC actively consider taking low-dose aspirin to reduce their risk of CRC.² Despite the publication of these national guidelines recommending a significant change in CRC prevention strategy, it has not been accompanied by an implementation strategy, rather relying on passive diffusion of the guidelines into clinical practice.

The new guidelines were endorsed by the National Health and Medical Research Council (NHMRC)

and adopted by the Royal Australian College of General Practitioners (RACGP). Meta-analyses of

randomised controlled trials of low-dose aspirin have demonstrated reduced incidence and mortality from colorectal cancer by 25% and 33% respectively, as well as a 33% reduction in all-cause cancer

mortality, when taken for at least 2.5 years.³ In addition to reducing the risk of colorectal cancer,

aspirin also reduces the risk of cardiovascular disease including myocardial infarctions, ischaemic

- strokes and transient ischaemic attacks by 6% per annum in primary prevention trials⁴ However, aspirin can cause side-effects including gastrointestinal haemorrhage, peptic ulcer and haemorrhagic stroke.
- This project aimed to explore clinicians' attitudes, practices, knowledge, opinions, and barriers and
- facilitators to the implementation of these guidelines, with the intention of developing implementation
- methods to increase the uptake of aspirin for CVD and CRC prevention, and reduce development of
- colorectal cancer in the Australian population.

Methods

Approach

A qualitative study using semi-structured interviews was conducted with a range of health

- professionals whom the new guidelines were most likely to directly impact, including
- gastroenterologists, geneticists, oncologists, genetic counsellors and general practitioners. A
- constructivist paradigm was used to generate new ideas from participants, using interviews to explore

current practice, knowledge and opinions toward recommending aspirin to people at average risk of

- CRC and potential barriers and facilitators to implementing the guidelines.
- Setting and sampling strategy

Purposive sampling was used to achieve maximum variation in profession type, age, gender, years of experience and those working in both rural and urban Victoria, and public and private practice settings. Recruitment was done through personal networks of the authors, as well as snowball sampling through social media posts, emailing and cold calling. As we sent out recruitment messages through different sources all participants opted in on their own. All participants provided written consent. General practitioners, as private practitioners, were reimbursed \$100 for their time as this group was the most difficult to recruit. Recruitment of all participants occurred between February and September 2019.

Data collection techniques

A semi-structured interview guide was developed based on the Consolidated Framework for

Implementation Research (CFIR)⁵ (Figure 1). CFIR is a conceptual framework developed to guide the

- assessment of implementation contexts. It consists of five constructs representing all areas of a
- healthcare setting that impact upon the successful implementation of a new intervention.⁶ The
- interview questions were adapted from the online CFIR guide, which provides a list of potentially
- relevant interview questions for each of the constructs.⁵ In this study, the 'intervention' was defined as
- the national guideline recommending consideration of aspirin for CRC prevention.

The interviews were conducted by three researchers by authors SM, PA and TY who had no existing

relationships with the participants. The interviewing researchers disclosed their position in the research to the participants and they were aware why the research was being conducted. Researcher

SM who interviewed the general practitioners, geneticists, oncologists and genetic counsellors is a

- highly experienced female qualitative researcher. Researchers PA who interviewed pharmacists and
- TY who interviewed gastroenterologists both males were students who were trained in qualitative
- methods and supervised by the authors. Interviews were audio recorded and transcribed verbatim.
- Field notes on the time and location were recorded in researchers' notebook following the interviews.
- Researchers met regularly to review the interview transcripts and discuss data and the emerging
- themes. Interview transcripts were not returned to participants.

Analysis

Qualitative analysis was managed using NVivo 12⁷. Complete coding was employed by the author who interviewed the participant. For enhanced interpretive rigour, several interviews in each participant group were co-coded by another researcher and progressively checked in regular researcher meetings. The coding for several interviews per clinician type was checked by a second researcher.

After first-level coding, codes were grouped into themes. Themes were then mapped onto the constructs from the CFIR⁶: characteristics of intervention, outer setting, inner setting, characteristics of individuals and process (Figure 1).

Implementation				
Characteristics of Intervention	Inner Setting	Outer Setting	Individuals Involved	Implementation Process
 Intervention source Evidence strength and quality Relative advantage Adaptability Trialability Complexity Design quality Cost 	 Structural characteristics Networks and communications Culture Implementation climate 	 Patient needs and resources Cosmopolitanism Peer pressure External policies and incentives 	 Knowledge and beliefs about the intervention Self-efficacy Individual stage of change Individual identification with organisation Other personal attributes 	 Planning Engaging Executing Reflecting and evaluating

Figure 1. Overview of the Consolidated Framework for Implementation Research. The CFIR provides constructs that have been associated with effective implementation.⁶

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Results

Sixty-four participants were interviewed (Table 1). Interviews ranged from 20-50-minutes and were face-to-face in the participants place of work, except for four GPs who were interviewed on the phone. The participants opted in by responding to recruitment messages and none dropped out. All participants were interviewed once. The interviews were conducted in participants' place of work, either in a clinic, pharmacy or hospital consulting room or meeting room. The researcher and participants were the only ones present during the interviews, except for with pharmacists if there were shopkeepers or pharmacy assistants present. We present the results according to the domains of CIFR.

Table 1. Characteristics of participants.

	Characteristics	
	Mean age (years)	41
	Sex, female (n)	35
	Profession (n)	
	Gastroenterologist	17
	Pharmacist	14
	General practitioner	16
	Familial cancer on (FCC) staff	
	Genetic counsellor	10
	Geneticists	4
	Oncologist	3
	Years in profession (n)	
	<10	23
	10 – 19	22
	20 – 29	8
	30+	11
	Work setting	
	General practice (%)	
	Bulk-billing clinic	31
	Private	69
	Hospital (gastroenterologists and FCC staff) (%)	
	Public	77
	Private	23
	Pharmacy (%)	
	Hospital	36
	Community	64
151		

1. Characteristics of the Intervention

Aspirin

Many participants expressed confusion regarding the dose of aspirin to be used. While some participants were comfortable deciding on a dose within the 100 - 300 mg range recommended in the guideline, others felt this range created uncertainty. (Quotations 1a and 1b)

- 1a "Well I think the range is ambiguous there. The numbers are not ambiguous at all there I suppose but it's just - it's out with normal practice I guess" General Practitioner, 30 years old
- 1b "And I think the risk in data coming out is how much is useful, like the dosage. We used to think that a low dose used to be good for other cardiovascular events, but in fact maybe it isn't depending on gender, age and weight." Gastroenterologist, 47 years old

Aspirin was perceived as cheap, safe and readily available by many participants, who stated this would facilitate their prescribing and patient uptake. With the rising costs of healthcare, participants thought the cheap nature of aspirin facilitated the implementation of the guidelines. (Quotation 1c) Barriers to implementation included concerns about possible side-effects of aspirin such as gastrointestinal bleeding and contraindications in people with multiple comorbidities. (Quotation 1d) 1c "It's cheap, which is the other thing; and, again, in the Australian healthcare system, where there are costs associated with a lot of treatments, to be able to recommend something that is - we're saying safe, the exception being the gastric irritation, and effective, and it's not going to break the bank for them to use it." General practitioner, 62 years 1d "And in terms of weighing up the side effects from aspirin, we've got the issue of the potential for those individuals who have got other comorbidities whether it's renal or allergies to aspirin or risk of stroke etc etc. You've got to weigh all those factors up before you consider putting someone on aspirin" Gastroenterologist, 59 years old CCA guideline Many participants mentioned the specific phrasing of the guidelines, namely that aspirin should be "actively considered". This language did not sufficiently encourage them to prioritise the recommendation, and implied uncertainty about the strength of evidence. (Quotation 1e) 1e "Because it's not strong, also, perhaps that's something that will be its - not its downfall, but will be negative because we already have a lot of strong guidelines" Geneticist, 32 years old Guidelines on the use of aspirin for disease prevention have changed over time, generating confusion among participants. Historically, aspirin was recommended for primary prevention of cardiovascular disease in certain at-risk patients, but guidelines were later altered, recommending it only for secondary prevention. Participants stated that it is hard to keep up with the latest recommendations, and that this ongoing change in advice caused reluctance to recommend them. (Quotation 1f) 1f "With aspirin, it was always for stroke prevention, and now they're turning around and saying no, we shouldn't be doing it for that! And you sort of wonder, well, is this going to be the same sort of thing? The, one of the issues with medications and guidelines as such is that they keep changing." Pharmacist, 50 years old 2. Inner Setting Despite the variety of specialities and workplace types, a common theme emerged of competing demands on clinicians' time limiting their capacity to discuss aspirin for the prevention of CRC. (Quotations 2a, 2b) Pharmacists suggested they could support GPs in counselling patients, given GPs have relatively short consultation times with their patients. Pharmacists commented on the closeness of their location to GP clinics and their potential to reiterate advice about aspirin given by the GP. (Quotation 2c) 2a "I think time's our major challenge. There's just not enough time to... especially that the pace that endoscopy list goes is fast and I think in private it's much faster. Public, even then; even if it's not pace, the patients had an anaesthetic - it's not really an appropriate time to be talking to them about long-term stuff." Gastroenterologist, 50 years old 2b "So we only actually see people when we can offer genetic testing and the rest of our work is done over the phone or we send letters. We are absolutely flat out at the moment. This is probably the only time today I will be sitting and not running around." Genetic counsellor, 35 years old

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2		
3	206	• 2c "I think, we should, way of promoting it, and probably we should be more proactive with
4	207	it, GPs tend to not especially, one of the pharmacies I work at is next to a bulk billing clinic
5	208	doctors are very much get them in get them out and don't spend much time with them so
6	200	that's where we can often come in to be that extra person that can either reinforce what the
7	205	doctor's told them on suggest other things. So we should be there in the front line work
8	210	aocior's tota them or suggest other things. So, we should be there in the front tine, yean,
9	211	promoting health." Pharmacist, 50 years old
10	212	
11	212	
12	213	3. Outer Setting
13	21/	Cancer Council Australia was perceived as a trustworthy organisation and this gave greater weight to
14	217	and trust in the guidelines (Quotation 3a)
15	213	and trust in the guidennes. (Quotation 5a)
10	216	• 3a "Look as long as this is done by the Cancer Council of Victoria. I'm trusting them so it
12	217	depends who is it behind but this is a credible source of information I would have hoped "
10	217 210	Conoral Practitionar 58 years old
20	210	General I racilloner, 38 years old
20 21	219	The initial results of the Aspirin in Reducing Events in the Elderly (ASPREE) Trial were published
27	220	after the Cancer Council Australia national clinical guidelines were released and shortly before
22	220	interviews for this study were conducted ⁸ The ASPREE trial showed low dose aspirin provided no
24	221	herefit in participants agod 70 90 years over a short term follow up of 4.7 years. Some participants in
25	222	benefit in participants aged 70-80 years over a short-term follow up of 4.7 years. Some participants in
26	223	our study, despite varying degrees of knowledge of the ASPREE trial results, were nesitant to
27	224	recommend aspirin for people even in the 50 to 70-year-old group covered by the guidelines, due to
28	225	the findings of the ASPREE trial in an older cohort. (Quotations 3b and 3c).
29	220	21 "So do to a set to a few annihility in alder a stimute, bind of maker we think should I be
30	226	• 30 So indi negative siday for aspirin in older patients; kind of makes me inink- should I be
31	227	giving it to someone with average risk of colorectal cancer?" Gastroenterologist, 32 years
32	228	old
33	220	• 20 "So there was a big study here in Australia and then a little bit of input from the US done
34	229	• So so there was a big study here in Australia, and then a tille bit of input from the OS able
35	230	over the tast jew years, came out tast year, the ASPREE study, so I ata a taik on it, so I tookea
36	231	at the primary prevention of aspirin in the cardiovascular disease, and it showed that low-
37	232	dose aspirin for healthy older adults had no impact on primary prevention and
38	233	cardiovascular risk" Pharmacist, 26 years old
39	224	
40	234	
41	235	4 Characteristics of Individuals
42	255	
43 44	236	whose role is it to recommend aspirin?
44 15	237	Hospital-based clinicians generally supported the guidelines and saw their role as advocates rather
45	238	than implementers of the guidelines. (Quotations 4a and 4b) All participants, including GPs, saw that
40	239	the primary responsibility to implement the aspirin guidelines rested in primary care. (Quotations 4c
47 70	240	and 4d)
40 49		
50	241	• 4a "So, you know I'm a Geneticist. I think talking to GPs and Gastroenterologists would be a
51	242	much better group [laughs] than Geneticists." Geneticist, 34 years old
52	242	Ale "Describe mus still some CD southed as a late Course if an and it is a late C
53	243	• 40 People are suil very GP centrea, so a lot of, even if we suggest things like this, a lot of
54	244	people would still then go and talk to their GP before they decided to start something."
55	245	Pharmacist, 50 years old
56	246	• As "If you understand what I mean it's absolutely. I source with these specialists I do think it
57	240	• • • • • • • • • • • • • • • • • • •
58	247	is part of the role of the GP to talk about these preventative health issues specifically
59	248	prescribing aspirin" General practitioner, 28 years old
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nteresting when new guidelines come out, because guidelines come out all the time, is a really - this is our bread and butter as a GP" General practitioner, 48 years old

areness of the CCA guidelines

awareness of the guidelines was mixed. The FCC staff were more knowledgeable of becifically as they work with populations at increased risk of CRC, and awareness of s about aspirin use in people with Lynch syndrome. Whereas GPs, pharmacists and sts were either unaware or had limited knowledge of the guidelines. (Figure 4. 14f)

- know about low-dose aspirin in bowel cancer is that it can be used, but in certain ons, but beyond that, I actually really don't know." Geneticist, 32 years old
- Ild say that going across, we have three different clinicians at work and I don't think heard them recommend aspirin for someone who actually doesn't have something ch syndrome." Genetic counsellor, 57 years old

of the CCA guidelines

cipants considered themselves as early adopters, they admitted that clinicians in ait before adopting clinical guidelines. (Quotation 5a) Most health professionals nts would be receptive to taking extra medication such as aspirin for CRC prevention. evertheless, a decision aid was thought to be potentially useful to facilitate the risks and benefits of taking aspirin. (Quotation 5c) Several participants could see liscuss aspirin as part of their usual consultation. (Quotation 5d)

- er doctors like to be on the tail end because they've been burnt a few times when we kind of flipped back the other way." General practitioner, 38 years old
- know, I think the people who already take tablets for something find it quite easy to in extra tablet. So, someone's already on a cholesterol tablet, they're on a high blood tablet, it's easy for them to add aspirin to that." Gastroenterologist, 60 years old
 - that (a decision aid) might have been useful for the patient to show them what could and how effective it is if they ask." General practitioner, 58 years old
 - know, I appreciate they're guidelines and they're not mandatory, and if it fits in with I would practice, I'm happy to sort of incorporate them into what I do." terologist, 65 years old

tudy to our knowledge to examine the perspectives of a wide range of Australian ecommending aspirin to reduce bowel cancer risk. Aspirin was considered as readily able and safe. However, the ambiguity about the recommended dose and perceived strength of the evidence was a concern for several clinicians. The media attention about the ASPREE 284 51 trial9 added to the perceived uncertainty about the evidence. Busy work environments meant limited 285 52 time to spend on prevention. The endorsement from Cancer Council Australia, a nationwide not-for-286 53 287 profit organisation, meant the guidelines were perceived as trustworthy and therefore more likely to 54 be implemented. 288 55

- 56 FCC staff and gastroenterologists are generally aware of aspirin recommendations for patients at 289 57
- increased CRC risk and suggested that GPs are better placed to discuss aspirin in those at average 290 58
- 291 risk. These hospital specialists felt they could advocate the use of aspirin but the ultimate 59
- 292 responsibility for initiation rested in general practice. Pharmacists similarly felt they could facilitate 60

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the process but would not initiate discussions about aspirin. GPs agreed that this was part of their role,for example when discussing bowel cancer screening, but had limited awareness of the guidelines.

There is often a large investment of time, resources and clinical expertise involved in producing
national clinical guidelines, however, there is typically no accompanying strategy to implement
them.^{10,11} Between 2003 and 2007, 313 clinical practice guidelines were produced in Australia by over
80 guideline producers¹², but with limited clinical uptake. ^{13,14}

The uptake of guidelines into clinical practice is influenced by several factors including the guideline characteristics, ease of implementation, clarity of the guidelines and individual clinicians' familiarity with the intervention and evidence.¹⁵ Our study highlights several of these factors which could act as barriers to widespread implementation of the aspirin guidelines. Superficially, one might expect recommending a familiar, low cost, over-the-counter drug would be easily implemented. But lack of clarity, partly due to the specific wording of the recommendation, could alter perceptions of the evidence and jeopardise uptake of the guideline.

Uncertainties amongst clinicians about the evidence for aspirin in disease prevention is exacerbated by changes in recommendations about its use in cardiovascular disease. The Cancer Council Australia guideline specifically considered the evidence as it relates to preventing colorectal cancer. It did not discuss related evidence of reduced incidence and mortality from other cancers³ or for the primary prevention of cardiovascular disease.¹⁶ The US Preventative Services Taskforce recommends aspirin for CRC prevention only in people who are also at moderately increased risk of cardiovascular disease.¹⁷ In addition, their recommendations about its use are stronger for people aged 50 to 59 years, compared with those aged 60 to 69 years because the risk of serious side-effects from aspirin increases with age.

There was little awareness amongst many participants of the additional effects of aspirin on all-cancer incidence and mortality, but this is an important additional consideration for patients when making informed decisions about taking aspirin. Clinicians in our study recognised the potential benefit of a decision aid to support discussions about taking aspirin. There is strong evidence to show that decision aids can support informed decision making, particularly when decisions require weighing up benefits and risks which are preference sensitive.¹⁸ Patients need to understand the potential benefits of aspirin in terms of reduced incidence and death from cancer and cardiovascular disease, and harms from gastrointestinal and intracranial haemorrhage. In a vignette study testing graphical approaches to communicating these harms and benefits from aspirin, over 70% of Australian patients aged 50-70 were willing to take aspirin for disease prevention.¹⁹ The use of a decision aid has the potential to inform the clinicians, which would enhance the clarity of the recommendation, and facilitate a discussion about the aspirin guidelines with patients.

45 327 Implications & limitations

In this in-depth qualitative study, we recruited a large sample of diverse participants representing different clinical disciplines, varied length of experience, and work settings. Although we recruited participants only from Victoria, we believe our findings are likely to be transferable to other Australian clinicians although we acknowledge that there may be other barriers and facilitators experienced by clinicians from remote locations.

The national guidelines on aspirin represent an important new approach to reducing the incidence and mortality of bowel cancer in Australia. But the absence of a strategic and more active implementation plan, means these guidelines are less likely to be translated into clinical practice.²⁰ Specific implementation strategies for general practice are necessary to increase the awareness and uptake of these guidelines. This could be supplemented by approaches to raise awareness in the community about the role of aspirin and tools to facilitate discussions between GPs and patients and support informed choices about CRC prevention.

3 340 Author statement:

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- 4
 341 Conception or design of the work: SM JM, FM, and JE. Acquisition, analysis or interpretation of data:
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COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Торіс	Item No.	Guide Questions/Description	Reported o
Domain 1: Possarsh toam			Page No.
and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with		~	
participants		<u> </u>	-
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of	7	What did the participants know about the researcher? e.g. personal	
the interviewer		goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator?	
		e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation	9	What methodological orientation was stated to underpin the study? e.g.	
and Theory		grounded theory, discourse analysis, ethnography, phenomenology,	
		content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience,	
		consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail,	
Sampla siza	12	How many participants were in the study?	
Non participation	12	How many participants were in the study!	
Cotting	15	How many people refused to participate or dropped out? Reasons?	
Setting of data collection	1.4	Where we the data collected 2 c. c. home, clinic, workplace	
	14	where was the data collected? e.g. nome, clinic, workplace	
Presence of non-	15	was anyone else present besides the participants and researchers?	
participants Description of severals	10		
Description of sample	16	what are the important characteristics of the sample? e.g. demographic	
Data collection		data, date	
	47		
Interview guide	1/	Were questions, prompts, guides provided by the authors? Was it pilot	
5	- 10	tested?	
kepeat interviews	18	were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Торіс	Item No.	Guide Questions/Description	Reported on
			Page No.
		correction?	
Domain 3: analysis and			
findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding	25	Did authors provide a description of the coding tree?	
tree			
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings?	
		Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. International Journal for Quality in Health Care. 2007. Volume 19, Number 6: pp. 349 – 357

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SPQR checklist for Clinicians' opinions on recommending aspirin to prevent colorectal cancer to Australians aged 50 to 70 years: a qualitative study Standards for Reporting Qualitative Research (SRQR)* http://www.equator-network.org/reporting-guidelines/srgr/ Page/line no(s). Title and abstract **Title** - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended Page 1/ line 1-3 16 **Abstract** - Summary of key elements of the study using the abstract format of the 18 intended publication; typically includes background, purpose, methods, results, and conclusions Page 2/ line 35-62 20 22 Introduction Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement Page 3/ line 75-90 Purpose or research question - Purpose of the study and specific objectives or 28 Page 3/ line 91-94 questions 30 Methods 32 34 Qualitative approach and research paradigm - Qualitative approach (e.g., Page 3/ line 99 ethnography, grounded theory, case study, phenomenology, narrative research) Page 3/ line and guiding theory if appropriate: identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended: rationale** 100 38 Researcher characteristics and reflexivity - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or Page 4/ lines 120 actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability - 126 Page 3/ line 105 Context - Setting/site and salient contextual factors; rationale** **Sampling strategy** - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale** Page 3/ line 104 Ethical issues pertaining to human subjects - Documentation of approval by an Page 10 / line 345 appropriate ethics review board and participant consent, or explanation for lack 54 - 347 thereof: other confidentiality and data security issues

Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	Page 3/ line 11
Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection: if/how the instrument(s) changed over the course of the study.	Page // line 1
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Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	Page 5/ line 14 and line 151
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Page 4/ line 1
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Page 4/ line 1: 129/ line 131-138
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Page 4/ line 134- 135

Synthesis and interpretation - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	Page 5-8/ line 143 - 280
Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Page 5-8/ line 143 - 280
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Integration with prior work, implications, transferability, and contribution the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of ea scholarship; discussion of scope of application/generalizability; identification unique contribution(s) to scholarship in a discipline or field	on(s) to arlier of Page 8- 9/ line 282 - 327
Limitations - Trustworthiness and limitations of findings	Page 9/ line 334 - 340

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Page 10/ line 359 - 361
Funding - Sources of funding and other support; role of funders in data collection interpretation, and reporting	n, Page 10/ line 357 - 358

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Clinicians' opinions on recommending aspirin to prevent colorectal cancer

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to Australians aged 50 to 70 years: a qualitative study

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34 Abstract

35 Objectives

36 Australian guidelines recommend all 50 to 70-year-olds without existing contraindications consider

taking low-dose aspirin (100 mg – 300 mg per day) for at least 2.5 years to reduce their risk of
developing colorectal cancer.

We aimed to explore clinicians', practices, knowledge, opinions, and barriers and facilitators to theimplementation of these new guidelines.

41 Methods

42 Semi-structured interviews were conducted with clinicians to whom the new guidelines may be

43 applicable (familial cancer clinic staff (geneticists, oncologists and genetic counsellors),

44 gastroenterologists, pharmacists, and general practitioners (GPs)).

45 The Consolidated Framework for Implementation Research (CFIR) underpinned the development of
46 the interview guide. Coding was inductive and themes were developed through consensus between the
47 authors.

48 Emerging themes were mapped onto the CFIR domains: characteristics of the intervention, outer 49 setting, inner setting, individual characteristics and process.

50 Results

Sixty-four interviews were completed between March and October 2019. Aspirin was viewed as a safe and cheap option for cancer prevention. GPs were considered by all clinicians as the most important health professionals for implementation of the guidelines. Cancer Council Australia, as a trusted organisation, was an important facilitator to guideline adoption. Uncertainty about aspirin dosage and perceived strength of the evidence, precise wording of the recommendation, previous changes to guidelines about aspirin, and conflicting findings from trials in older populations were barriers to implementation.

58 Conclusion

59 Widespread adoption of these new guidelines could be an important strategy to reduce the incidence 60 of bowel cancer, but this will require more active implementation strategies focused on primary care 61 and the wider community.

62 Strengths and limitations of this study

63 Up to five short bullet points, no longer than one sentence each, that relate specifically to the methods.64 They should not include the results of the study.

- We recruited a large and diverse group of participants representing different clinical disciplines, varied length of experience, and work settings.
 - We applied an established theoretical framework to study guideline implementation
 - We recruited participants only from one state, Victoria, but we believe our findings are likely to be transferable to other Australian clinicians
 - We acknowledge that there may be other barriers and facilitators experienced by clinicians from remote locations.

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Introduction

In 2019, colorectal cancer (CRC) was the second most commonly diagnosed cancer in Australia in men and women (9,069 cases and 7,329 cases, respectively).¹ In November 2017, Cancer Council Australia updated their guidelines for the prevention of CRC to recommend that all people aged 50-70 who are at average risk of CRC actively consider taking low-dose aspirin to reduce their risk of CRC.² Despite the publication of these national guidelines recommending a significant change in CRC prevention strategy, it has not been accompanied by an implementation strategy, rather relying on passive diffusion of the guidelines into clinical practice.

The new guidelines were endorsed by the National Health and Medical Research Council (NHMRC)

and adopted by the Royal Australian College of General Practitioners (RACGP). Meta-analyses of

- randomised controlled trials of low-dose aspirin have demonstrated reduced incidence and mortality
- from colorectal cancer by 25% and 33% respectively, as well as a 33% reduction in all-cause cancer mortality, when taken for at least 2.5 years.³ In addition to reducing the risk of colorectal cancer,
- aspirin also reduces the risk of cardiovascular disease (CVD) including myocardial infarctions,
- ischaemic strokes and transient ischaemic attacks by 6% per annum in primary prevention trials⁴
- However, aspirin can cause side-effects including gastrointestinal haemorrhage, peptic ulcer and
- haemorrhagic stroke.
- This project aimed to explore clinicians', practices, knowledge, opinions, and barriers and facilitators
- to the implementation of these guidelines, with the intention of developing implementation methods
- to increase the uptake of aspirin for CVD and CRC prevention, and reduce development of colorectal cancer in the Australian population.

Methods

Approach

- A qualitative case study using semi-structured interviews was conducted with a range of health
- professionals whom the new guidelines were most likely to directly impact, including
- gastroenterologists, geneticists, oncologists, genetic counsellors and general practitioners. A
- constructivist paradigm was used to generate new ideas from participants, using interviews to explore
- current practice, knowledge and opinions toward recommending aspirin to people at average risk of
- CRC and potential barriers and facilitators to implementing the guidelines.

Setting and sampling strategy

Recruitment was done through personal networks of the authors, as well as snowball sampling through social media posts, emailing through the Familial Cancer Centre (FCC) staff email list in the Parkville Precinct and cold calling general practices through the University of Melbourne's Department of General Practice Victorian Research and Education Network database. From these different sources of participants, we purposively sampled to achieve maximum variation in profession type, age, gender, years of experience and those working in both rural and urban Victoria, and public and private practice settings. As we sent out recruitment messages through different sources all participants opted in on their own. All participants provided written consent. General practitioners, as private practitioners, were reimbursed \$100 for their time as this group was the most difficult to recruit. Recruitment of all participants occurred between February and September 2019.

Data collection techniques

A semi-structured interview guide was developed based on the Consolidated Framework for

- Implementation Research (CFIR)⁵ (Table 1). CFIR is a conceptual framework developed to guide the
- assessment of implementation contexts. It consists of five domains and 39 constructs representing all areas of a healthcare setting that impact upon the successful implementation of a new intervention.⁶
- The five overarching CFIR domains covers aspects of the design and cost or the intervention

119 characteristics, aspects of organisations and how they operate in the inner setting, individuals within

- the organisations or characteristics of individuals like the culture and leadership, how outside
 organisations or outer settings and beliefs, and implementation processes impact upon successful
 implementation of an intervention.
- implementation of an intervention.
 123 Interview questions were adapted from the online CFIR guide, which provides a list of potentially
 124 relevant interview questions for each of the constructs.⁵ In this study, the 'intervention' was defined as
 111 125 the national guideline recommending consideration of aspirin for CRC prevention. [Supplementary
- **126** Section 1].

The interviews were conducted by three researchers by authors SM, PA and TY who had no existing relationships with the participants. The interviewing researchers disclosed their position in the research to the participants and they were aware why the research was being conducted. Researcher SM who interviewed the general practitioners, geneticists, oncologists and genetic counsellors is a highly experienced female qualitative researcher. Researchers PA who interviewed pharmacists and TY who interviewed gastroenterologists both were male students who were trained in qualitative methods and supervised by experienced qualitative researchers (SM, JM, JE). Interviews were audio recorded and transcribed verbatim. Field notes on the time and location were recorded in researchers' notebook following the interviews. Researchers met regularly to review the interview transcripts and discuss data and the emerging themes. Interview transcripts were not returned to participants.

26 137 Analysis

- Qualitative transcript data were managed using NVivo 12^7 . The interviews for each type of participant; FCC staff, GPs, gastroenterologists and pharmacists were initially analysed separately. Complete coding of each interview was conducted by the author who interviewed the participant where everything that was spoken by the participants was organised into specific topics. At the first level of coding codes were produced inductively for each of the participant professional groups upon completion. For enhanced interpretive rigour, several interviews in each participant group were co-coded by another researcher and progressively checked in regular researcher meetings. The coding for several interviews per participant type was checked by a second researcher.
- After first-level coding, codes were grouped into themes. Thematic analysis was employed at this level where themes emerged from the first-level coding through discussions between the researchers. About 20 themes per professional group type were defined. Themes from each professional group type were discussed between the researchers brought together if they could be. Themes were then mapped onto the domain and constructs from the CFIR⁶: characteristics of intervention, outer setting, inner setting, characteristics of individuals and process (Table 1).
- Table 1. Overview of the Consolidated Framework for Implementation Research. The CFIR provides constructs that have been associated with effective implementation.⁶

Characteristics of Intervention	Inner Setting	Outer Setting	Individuals Involved	Implementation Process
 Intervention source Evidence strength and quality Relative advantage Adaptability Trialability Complexity Design quality Cost 	 Structural characteristics Networks and communications Culture Implementation climate 	 Patient needs and resources Cosmopolitanism Peer pressure External policies and incentives 	 Knowledge and beliefs about the intervention Self-efficacy Individual stage of change Individual identification with organisation Other personal attributes 	 Planning Engaging Executing Reflecting and evaluating

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6			
7	156	Results	
8 Q	157	Sixty-four participants were interviewed (Table 2). Interviews ranged from 20-	50 minutes and w
10	158	face-to-face in the participants place of work (clinic, pharmacy or hospital cons	sulting or meeting
11	159	room), except for four GPs who were interviewed over the phone. The research	er and participant
12	160	were the only ones present during the interviews, except for with pharmacists i	f there were
13	161	shopkeepers or pharmacy assistants present. The results are presented accordin	ng to the domains
14 15	162	CFIR (Table 3).	
16	163	Table 2. Characteristics of participants.	
17		Characteristics	
18 19		Mean age (years)	41
20		Sex, female (n)	35
21		Profession (n)	
22		Gastroenterologist	17
23		Pharmacist	14
24		General practitioner	16
25		Familial cancer on (FCC) staff	10
0 7		Genetic counsellor	10
, 8		Opeologist	4
9		Vears in profession (n)	5
0			23
1		10-19	22
2		20 – 29	8
3		30+	11
94 85		Work setting	
6		General practice (%)	
7		Bulk-billing clinic	31
8		Private	69
9		Hospital (gastroenterologists and FCC staff) (%)	77
.0 1		Private	23
+1 L2		Pharmacy (%)	20
3		Hospital	36
4		Community	64
5	164		
6	165		
·/ o	105		
0 9			
0			
1			
2			
3			
94 55			
,5 56			
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50			

Table 3. Results of themes from interviews with 64; general practitioners (GPs), gastroenterologists, familial cancer clinic
 staff (FCC staff), and pharmacists mapped onto the Consolidated Framework for Implementation Research.

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Characteristics of Intervention	Inner Setting	Outer Setting	Individuals Involved	Implementation Process
-The participants	- Participants	- As the guidelines	- Geneticists,	- Participants
expressed confusion	agreed that having	were first	pharmacists and	thought of
around the aspirin	limited time would	published by the	gastroenterologists	themselves as
losing (100-300 mg)	be a barrier to	Cancer Council	saw their role as	early adopters but
	implementation as	Australia, they	advocates of the	agreed that it
Some facilitators to	they are usually	were more	guidelines	takes time for
aspirin implementation	very busy	trustworthy		most clinicians to
included; the low cost,			- All clinicians	implement new
availability and safety	- Pharmacists	- The ASPREE	agreed that it is	interventions
	specifically saw	trial although it	GPs role to	
The 'actively	their role to support	was a study done in	implement the	- Participants
considered' wording of	what the GPs	the elderly (70 –	guidelines into	agreed that
he guidelines implied	advise, and thought	80-year-old)	general practice,	patients would be
some uncertainty about	they should	population, it	GPs agreed it was	receptive to the
the strength of the	reiterate this to	introduced some	their role	recommendations
evidence	patients	hesitancy even for		
		the 50 – 70-year-	- FCC staff were	- A decision aid
The aspirin guidelines		old population	aware of the	would be helpful
have changed over			guidelines, but	in facilitating a
time which presents as		- The guidelines	other clinicians had	discussion with
a barrier to		have changed a lot	limited knowledge	patients
implementation		over time for CVD		

29 168

1. Characteristics of the Intervention

170 Aspirin

Many participants expressed confusion regarding the dose of aspirin recommended for colorectal cancer prevention. While some participants were comfortable deciding on a dose within the 100 – 300mg range specified in the guidelines, others felt that this does range indicated uncertainty in the guidelines. (Quotations 1a and 1b)

- 175
 1a "Well I think the range is ambiguous there. The numbers are not ambiguous at all there I suppose but it's just it's out with normal practice I guess" General Practitioner, 30 years old
 - 177 1b "And I think the risk in data coming out is how much is useful, like the dosage. We used to think that a low dose used to be good for other cardiovascular events, but in fact maybe it isn't depending on gender, age and weight." Gastroenterologist, 47 years old
- Aspirin was perceived as cheap, safe and readily available by many participants, who stated this would facilitate their prescribing and patient uptake. With the rising costs of healthcare, participants thought the cheap nature of aspirin facilitated the implementation of the guidelines. (Quotation 1c) Barriers to implementation included concerns about possible side-effects of aspirin such as gastrointestinal bleeding and contraindications in people with multiple comorbidities. (Quotation 1d)
- 185
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 10 "It's cheap, which is the other thing; and, again, in the Australian healthcare system, where there are costs associated with a lot of treatments, to be able to recommend something that is - we're saying safe, the exception being the gastric irritation, and effective, and it's not going to break the bank for them to use it." General practitioner, 62 years
- 189
 189
 190
 1d "And in terms of weighing up the side effects from aspirin, we've got the issue of the potential for those individuals who have got other comorbidities whether it's renal or

1		Current formatting for publication in BMJ Open
1 2		
3	191	allergies to aspirin or risk of stroke etc etc. You've got to weigh all those factors up before
4 5	192	you consider putting someone on aspirin" Gastroenterologist, 59 years old
6	193	CCA guideline
7	194	Many participants mentioned the specific phrasing of the guidelines, namely that aspirin should be
ð G	195	"actively considered". This language did not sufficiently encourage them to prioritise the
10	196	recommendation, and implied uncertainty about the strength of evidence. (Quotation 1e)
11	197	• 1e "Because it's not strong also perhaps that's something that will be its - not its downfall
12	198	but will be negative because we already have a lot of strong guidelines" Geneticist. 32 years
13 14	199	old
15		
16	200	2. Inner Setting
17	201	Despite the variety of specialities and workplace types, a common theme emerged of competing
18	202	(Quotations 2a, 2b) Bharmanists suggested they could support GBs in counselling patients, given GBs
20	203	have relatively short consultation times with their nations. Pharmacists commented on the closeness
21	204	of their location to GP clinics and their potential to reiterate advice about aspirin given by the GP
22	206	(Ouotation 2c)
23		
24 25	207	• 2a "I think time's our major challenge. There's just not enough time to especially that the
26	208	pace that endoscopy list goes is fast and I think in private it's much faster. Public, even then;
27	209	even if it's not pace, the patients had an andesthetic - it's not really an appropriate time to be talking to them about long term stuff." Gastroanterologist 50 years old
28	210	auking to them about tong-term stuff. Gustroenterologist, 50 years old
29 30	211	• 2b "So we only actually see people when we can offer genetic testing and the rest of our work
31	212	is done over the phone or we send letters. We are absolutely flat out at the moment. This is
32	213	probably the only time today I will be sitting and not running around." Genetic counsellor, 35
33	214	years old
34 35	215	• 2c "I think, we should, way of promoting it, and probably we should be more proactive with
36	216	it, GPs tend to not especially, one of the pharmacies I work at is next to a bulk billing clinic
37	217	doctors are very much get them in, get them out, and don't spend much time with them. so
38	218	that's where we can often come in to be that extra person that can either reinforce what the
39 40	219	doctor's told them or suggest other things. So, we should be there in the front line, yeah,
41	220	promoting nealth. Pharmacist, 50 years old
42	221	
43 44	222	3 Outer Setting
45	222	Cancer Council Australia was perceived as a trustworthy organisation and this gave greater weight to
46	223	and trust in the guidelines (Ouotation 3a)
47		
48 ⊿0	225	• 3a "Look as long as this is done by the Cancer Council of Victoria, I'm trusting them so it
50	226	depends who is it behind, but this is a credible source of information I would have hoped."
51	227	General Pracilioner, 38 years old
52	228	The initial results of the Aspirin in Reducing Events in the Elderly (ASPREE) Trial were published
53 54	229	after the Cancer Council Australia national clinical guidelines were released, and shortly before
55	230	interviews for this study were conducted. ⁸ The ASPREE trial showed low-dose aspirin provided no
56	231	benefit in participants aged 70-80 years over a short-term follow up of 4.7 years. ⁹ Some participants
57	232	in our study, despite varying degrees of knowledge of the ASPREE trial results, were hesitant to
58 50	233 22∥	recommend aspirin for people even in the 50 to /0-year-old group covered by the guidelines, due to the findings of the ASPREE trial despite being conducted in a different age schort (Quotations 2)
60	∠54 22⊑	and 3c)
	200	una sej.

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3b "So that negative study for aspirin in older patients; kind of makes me think- should I be giving it to someone with average risk of colorectal cancer?" Gastroenterologist, 32 years old • 3c "So there was a big study here in Australia, and then a little bit of input from the US done over the last few years, came out last year, the ASPREE study, so I did a talk on it, so I looked at the primary prevention of aspirin in the cardiovascular disease, and it showed that low-dose aspirin for healthy older adults had no impact on primary prevention and cardiovascular risk" Pharmacist, 26 years old Guidelines on the use of aspirin for disease prevention have changed over time, generating confusion among participants. Historically, aspirin was recommended for primary prevention of cardiovascular disease in certain at-risk patients, but guidelines were later altered, recommending it only for secondary prevention.^{10,11} Participants stated that it is hard to keep up with the latest recommendations, and that this ongoing change in advice caused reluctance to recommend them. (Quotation 3d) 3d "With aspirin, it was always for stroke prevention, and now they're turning around and saying no, we shouldn't be doing it for that! And you sort of wonder, well, is this going to be the same sort of thing? The, one of the issues with medications and guidelines as such is that they keep changing." Pharmacist, 50 years old 4. Characteristics of Individuals Whose role is it to recommend aspirin? Hospital-based clinicians generally supported the guidelines and saw their role as advocates rather than implementers of the guidelines. (Quotations 4a and 4b) All participants, including GPs, saw that the primary responsibility to implement the aspirin guidelines rested in primary care. (Quotations 4c and 4d) 4a "So, you know I'm a Geneticist. I think talking to GPs and Gastroenterologists would be a much better group [laughs] than Geneticists." Geneticist, 34 years old 4b "People are still very GP centred, so a lot of, even if we suggest things like this, a lot of people would still then go and talk to their GP before they decided to start something." Pharmacist, 50 years old 4c "If you understand what I mean, it's absolutely... I agree with those specialists, I do think it is part of the role of the GP to talk about these preventative health issues specifically prescribing aspirin" General practitioner, 28 years old 4d "It's interesting when new guidelines come out, because guidelines come out all the time, and this is a really - this is our bread and butter as a GP" General practitioner, 48 years old Knowledge / awareness of the CCA guidelines Knowledge and awareness of the guidelines was mixed. The FCC staff were more knowledgeable of the guidelines, specifically as they work with populations at increased risk of CRC, and awareness of recommendations about aspirin use in people with Lynch syndrome. Whereas GPs, pharmacists and gastroenterologists were either unaware or had limited knowledge of the guidelines. (Quotations 4e and 4f) 4e "All I know about low-dose aspirin in bowel cancer is that it can be used, but in certain populations, but beyond that, I actually really don't know." Geneticist, 32 years old

1 2		
2 3 4 5 6	279 280 281	• 4f "I would say that going across, we have three different clinicians at work and I don't think I've ever heard them recommend aspirin for someone who actually doesn't have something like Lynch syndrome." Genetic counsellor, 57 years old
7	282	5. Process
8 9	283	Implementation of the CCA guidelines
10	284	While most participants considered themselves as early adopters, they admitted that clinicians in
11	285	general would wait before adopting new clinical guidelines. (Quotation 5a) Most health professionals
12	286	agreed that patients would be receptive to taking extra medication such as aspirin for CRC prevention.
13 14	287	(Quotation 5b) Nevertheless, a decision aid was thought to be potentially useful to facilitate
15	288	discussion about the risks and benefits of taking aspirin. (Quotation 5c) Several participants could see
16	289	how they could discuss aspirin as part of their usual consultation. (Quotation 5d)
17 18 19	290 291	• 5a "Other doctors like to be on the tail end because they've been burnt a few times when things have kind of flipped back the other way." General practitioner, 38 years old
20 21 22 23	292 293 294	• 5b "You know, I think the people who already take tablets for something find it quite easy to beguile an extra tablet. So, someone's already on a cholesterol tablet, they're on a high blood pressure tablet, it's easy for them to add aspirin to that." Gastroenterologist, 60 years old
24 25 26	295 296	• 5c "Well that (a decision aid) might have been useful for the patient to show them what could happen and how effective it is if they ask." General practitioner, 58 years old
27 28 29 30	297 298 299	• 5d "You know, I appreciate they're guidelines and they're not mandatory, and if it fits in with the way I would practice, I'm happy to sort of incorporate them into what I do." Gastroenterologist, 65 years old
31 22		Discussion
32 33	300	Discussion
34	301	This is the first study to our knowledge to examine the perspectives of a wide range of Australian
35	302	clinicians about recommending aspirin to reduce bowel cancer risk. Aspirin was considered as readily
36	303	available, allordable and sale. However, the amolguity about the recommended dose and perceived
3/	205	trial ¹² added to the perceived uncertainty about the evidence. Busy work environments meant limited
30 39	305	time to spend on prevention. The endorsement from Cancer Council Australia, a nationwide not-for-
40	307	profit organisation meant the guidelines were perceived as trustworthy and therefore more likely to
41	308	be implemented.
42 42	200	
43	309 310	FUC stars and gastroenterologists are generally aware of aspirin recommendations for patients at increased CRC risk and suggested that GPs are better placed to discuss aspirin in those at average

- increased CRC risk and suggested that GPs are better placed to discuss aspirin in those at average
 risk. These hospital specialists felt they could advocate the use of aspirin but the ultimate
- 312 responsibility for initiation rested in general practice. Pharmacists similarly felt they could facilitate
- the process but would not initiate discussions about aspirin. GPs agreed that this was part of their role,
 for example when discussing bowel cancer screening, but had limited awareness of the guidelines.
- There is often a large investment of time, resources and clinical expertise involved in producing
 national clinical guidelines, however, there is typically no accompanying strategy to implement
 them.^{13,14} Between 2003 and 2007, 313 clinical practice guidelines were produced in Australia by over
 80 guideline producers¹⁵, but with limited clinical uptake. ^{16,17}
- The uptake of guidelines into clinical practice is influenced by several factors including the guideline
 characteristics, ease of implementation, clarity of the guidelines and individual clinicians' familiarity
 with the intervention and evidence.¹⁸ Our study highlights several of these factors which could act as
 barriers to widespread implementation of the aspirin guidelines. Superficially, one might expect

recommending a familiar, low cost, over-the-counter drug would be easily implemented. But lack of
clarity, partly due to the specific wording of the recommendation, could alter perceptions of the
evidence and jeopardise uptake of the guideline.

Uncertainties amongst clinicians about the evidence for aspirin in disease prevention is exacerbated by changes in recommendations about its use in cardiovascular disease. The Cancer Council Australia guideline specifically considered the evidence as it relates to preventing colorectal cancer. It did not discuss related evidence of reduced incidence and mortality from other cancers³ or for the primary prevention of cardiovascular disease.¹⁹ The US Preventative Services Taskforce recommends aspirin for CRC prevention only in people who are also at moderately increased risk of cardiovascular disease.²⁰ In addition, their recommendations about its use are stronger for people aged 50 to 59 years, compared with those aged 60 to 69 years because the risk of serious side-effects from aspirin increases with age.

There was little awareness amongst many participants of the additional effects of aspirin on all-cancer incidence and mortality, but this is an important additional consideration for patients when making informed decisions about taking aspirin. Clinicians in our study recognised the potential benefit of a decision aid to support discussions about taking aspirin. There is strong evidence to show that decision aids can support informed decision making, particularly when decisions require weighing up benefits and risks which are preference sensitive.²¹ Patients need to understand the potential benefits of aspirin in terms of reduced incidence and death from cancer and cardiovascular disease, and harms from gastrointestinal and intracranial haemorrhage. In a vignette study testing graphical approaches to communicating these harms and benefits from aspirin, over 70% of Australian patients aged 50-70 were willing to take aspirin for disease prevention.²² The use of a decision aid has the potential to inform the clinicians which addresses a major barrier to implementation, as GPs have limited awareness of the guidelines. A decision aid would enhance the clarity of the recommendation and facilitate a discussion about the aspirin guidelines with patients.

3334 348 Implications & limitations

In this in-depth qualitative study, we recruited a large sample of diverse participants representing different clinical disciplines, varied length of experience, and work settings. Although we recruited participants only from Victoria, we believe our findings are likely to be transferable to other Australian clinicians although we acknowledge that there may be other barriers and facilitators experienced by clinicians from remote locations.

The national guidelines on aspirin represent an important new approach to reducing the incidence and mortality of bowel cancer in Australia. But the absence of a strategic and more active implementation plan, means these guidelines are less likely to be translated into clinical practice.²³ Specific implementation strategies for general practice are necessary to increase the awareness and uptake of these guidelines. Our findings suggest that a stronger statement of recommendation and clarity about dosage are required. Engagement with pharmacists is also necessary to ensure they are aware of the guidelines and are prepared to endorse any advice from someone's GP about using aspirin. These implementation strategies could be supplemented by approaches to raise awareness in the community about the role of aspirin and decision aids to facilitate discussions between GPs and patients and support informed choices about CRC prevention.

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54364
364Author statement:

365 Conception or design of the work: SM JM, FM, and JE. Acquisition, analysis or interpretation of data:
366 SM, JM, TY, PA, SS NK, PN. Drafting the work: SM. Critically revising the work: SM, SS, PL and
367 JE. Final approval of submitted version: all authors.

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3	368	Ethic	s Approval: Ethical approval was provided by the Human Ethics Sub-Committee of the				
4	369	University of Melbourne (Ethics ID: 1853266) and all participants provided informed written consent					
5	370	before taking part in this project					
6	570	001010	e taking part in this project.				
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13	376	Sibel	Saya <u>https://orid.org/0000-0002-4/96-6852</u>				
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17							
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21	382	Data	availability: De-identified participant transcripts are available upon request and are stored in the				
22	383	Unive	ersity of Melbourne secure two-step verification cloud which is only accessible by a University				
23	384	laptop	o and VPN. If you would like to request transcript data, please contact the first author.				
24							
25	385	Comj	peting interests: JE and FM were members of the Cancer Council Australia guideline				
20	386	devel	opment group which recommends the use of low dose aspirin for the prevention of colorectal				
27	387	cance	r.				
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30	388	Refer	rences				
31	200	1	Australian Institute of Health and Welfore Cancer in Australia, Cancer in Australia (2010)				
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Supplementary Materials

Clinicians' opinions on recommending aspirin to prevent colorectal cancer to Australians aged 50 to 70 years: a qualitative study

S1. Interview schedule

Clinicians' interviews will be guided by the following schedule which only provides general areas to be covered.

**Remind them that you'll be recording the interview and START recording

DEMOGRAPHICS

• Age, gender, years of practice, specialization, place(s) of work: clinic(s) or hospital(s)

INTRODUCE CANCER COUNCIL GUIDELINES

(Show laminated version of summary / recommendations)

- Are you aware of the new guidelines? What is your understanding of the aspirin recommendations?
- Are you aware of guidelines that recommend prescribing aspirin to prevent bowel cancer?

OPINION ON GUIDELINES

- If aware of guidelines: what is your professional opinion of them?
- What are your thoughts underpinning the evidence around these guidelines?
- What do you think about using aspirin to prevent bowel cancer?
- Are you aware of the potential benefits and harms of using aspirin to prevent bowel cancer?
- Do you have clinical experience with the harms of using aspirin?

CURRENT PRACTICE/ PREVENTION

- When you consult with patients, what bowel cancer and cardiovascular disease prevention strategies do you incorporate into the consultation?
- Do you think this is part of your role as a general practitioner?
 - *If not:* whose role do you think it is?
- Do you currently recommend aspirin to patients?
- Which patients would you and would you not consider recommending aspirin to? Why?
 - Specific conditions, prevention?
 - How about those with or without a family history (e.g. Lynch syndrome)?

PATIENT OPINION

- What do think your patients would feel about using aspirin preventively?
- Have you had any feedback from patients about their experience of using aspirin preventively?

PATIENT EDUCATION

- How would you go about explaining the benefits and potential harms of taking aspirin?
- What supportive information would you use and why?

INTRODUCE EXPECTED FREQUENCY TREES

Show clinician the **2** expected frequency trees – **incidence** and **mortality**. Provide **evidence** for where the **numbers come from**. Emphasise it was developed for people aged **50-70**.

- What do you think about the EFT?
- Would the decision aid be helpful in these discussions with pts?

NEW GUIDELINE IMPLEMENTATION: ROUTINE PRACTICE

- Generally, when there is a new guideline, how do you find out about it?
- How do you incorporate new guidelines into practice?
- What challenges do you encounter when implementing new guidelines?
 - Private vs public
- How does your clinic/hospital implement new guidelines?
- Are you more likely to be early adopter or late adopter for new guidelines? Do you tend to wait to see what your colleagues are doing before starting to adopt new recommendations?

3

4 5

6

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript

where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript

accordingly before submitting or note N/A.

Торіс	Item No.	Guide Questions/Description	Reported on
			Page No.
Domain 1: Research team			
and reflexivity			
Personal characteristics			•
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with			
participants		<u>A</u>	•
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of	7	What did the participants know about the researcher? e.g. personal	
the interviewer		goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator?	
		e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation	9	What methodological orientation was stated to underpin the study? e.g.	
and Theory grounded theory, discourse analysis, ethnography, phen		grounded theory, discourse analysis, ethnography, phenomenology,	
content analysis			
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience,	
		consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail,	
		email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-	15	Was anyone else present besides the participants and researchers?	
participants			
Description of sample	16	What are the important characteristics of the sample? e.g. demographic	
		data, date	
Data collection			•
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot	
		tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	

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Торіс	Item No.	Guide Questions/Description	Reported o	
			Page No.	
		correction?		
Domain 3: analysis and				
indings				
Data analysis				
Number of data coders	24	How many data coders coded the data?		
Description of the coding	25	Did authors provide a description of the coding tree?		
ree				
Derivation of themes 26 Were themes identified in advance or derived from the		Were themes identified in advance or derived from the data?		
Software	27	What software, if applicable, was used to manage the data?		
Participant checking	28	Did participants provide feedback on the findings?		
Reporting				
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings?		
		Was each quotation identified? e.g. participant number		
Data and findings consistent 30 Was there consistency between the data presented and the finding		Was there consistency between the data presented and the findings?		
Clarity of major themes	31	Were major themes clearly presented in the findings?		
Clarity of minor themes 32		Is there a description of diverse cases or discussion of minor themes?		

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. International Journal for Quality in Health Care. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

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Title :	Standards for Reporting Qualitative Research (SRQR)* http://www.equator-network.org/reporting-guidelines/srqr/ and abstract	Page/line no(s).
Title :	http://www.equator-network.org/reporting-guidelines/srqr/ and abstract	Page/line no(s).
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_	Title Consists description of the nature and topic of the study identifying the study	
-	as qualitative or indicating the approach (e.g., ethnography, grounded theory) or	
	data collection methods (e.g., interview, focus group) is recommended	Page 1/ line 1-3
	Abstract - Summary of key elements of the study using the abstract format of the	
	intended publication; typically includes background, purpose, methods, results, and	Page 2/ line 35.62
L		Fage 2/ III = 35-02
les ter a		
Intro	auction	Т
	Problem formulation - Description and significance of the problem/phenomenon	
Ļ	studied; review of relevant theory and empirical work; problem statement	Page 3/ line 75-90
	Purpose or research question - Purpose of the study and specific objectives or	
	questions	Page 3/ line 91-94
Meth	ods	
Γ		
	Qualitative approach and research paradigm - Qualitative approach (e.g.,	
	ethnography, grounded theory, case study, phenomenology, narrative research)	Page 3/ line 99
	and guiding theory if appropriate; identifying the research paradigm (e.g.,	Page 3/ line
F	postpositivist, constructivist/ interpretivist) is also recommended; rationale***	
	Researcher characteristics and reflexivity - Researchers' characteristics that	
	may influence the research, including personal attributes, qualifications/experience,	
	actual interaction between researchers' characteristics and the research questions	Page 4/ lines 120
	approach, methods, results, and/or transferability	- 126
Γ		
Ļ	Context - Setting/site and salient contextual factors; rationale**	Page 3/ line 105
	Sampling strategy - How and why research participants, documents, or events	
	were selected: criteria for deciding when no further sampling was necessary (e.g.,	
	sampling saturation); rationale**	Page 3/ line 104
Ē		
	Etnical issues pertaining to human subjects - Documentation of approval by an	Page 10 / line 345
	appropriate ethics review board and participant consent, or explanation for IACK thereof: other confidentiality and data security issues	- 347

Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	Page 3/ line 113
Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Page 4/ line 126
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	Page 5/ line 143 and line 151
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Page 4/ line 120
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Page 4/ line 12 129/ line 131-138
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Page 4/ line 134- 135
ults/findings	

143 - 280
Page 5-8/ line 143 - 280

Discussion	
Integration with prior work, implications, transferability, and contribution(s the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlied scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field) to r Page 8- 9/ line 282 - 327
Limitations - Trustworthiness and limitations of findings	Page 9/ line 334 - 340

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Page 10/ line 359 - 361
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Page 10/ line 357 - 358

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Clinicians' opinions on recommending aspirin to prevent colorectal cancer to Australians aged 50 to 70 years: a qualitative study

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Clinicians' opinions on recommending aspirin to prevent colorectal cancer

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to Australians aged 50 to 70 years: a qualitative study

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Current formatting for publication in BMJ Open

34 Abstract

35 Objectives

36 Australian guidelines recommend all 50 to 70-year-olds without existing contraindications consider

taking low-dose aspirin (100 mg – 300 mg per day) for at least 2.5 years to reduce their risk of
developing colorectal cancer.

We aimed to explore clinicians', practices, knowledge, opinions, and barriers and facilitators to theimplementation of these new guidelines.

41 Methods

42 Semi-structured interviews were conducted with clinicians to whom the new guidelines may be

43 applicable (familial cancer clinic staff (geneticists, oncologists and genetic counsellors),

44 gastroenterologists, pharmacists, and general practitioners (GPs)).

45 The Consolidated Framework for Implementation Research (CFIR) underpinned the development of
46 the interview guide. Coding was inductive and themes were developed through consensus between the
47 authors.

48 Emerging themes were mapped onto the CFIR domains: characteristics of the intervention, outer 49 setting, inner setting, individual characteristics and process.

50 Results

Sixty-four interviews were completed between March and October 2019. Aspirin was viewed as a safe and cheap option for cancer prevention. GPs were considered by all clinicians as the most important health professionals for implementation of the guidelines. Cancer Council Australia, as a trusted organisation, was an important facilitator to guideline adoption. Uncertainty about aspirin dosage and perceived strength of the evidence, precise wording of the recommendation, previous changes to guidelines about aspirin, and conflicting findings from trials in older populations were barriers to implementation.

58 Conclusion

59 Widespread adoption of these new guidelines could be an important strategy to reduce the incidence 60 of bowel cancer, but this will require more active implementation strategies focused on primary care 61 and the wider community.

62 Strengths and limitations of this study

63 Up to five short bullet points, no longer than one sentence each, that relate specifically to the methods.64 They should not include the results of the study.

- We recruited a large and diverse group of participants representing different clinical disciplines, varied length of experience, and work settings.
 - We applied an established theoretical framework to study guideline implementation
 - We recruited participants only from one state, Victoria, but we believe our findings are likely to be transferable to other Australian clinicians
 - We acknowledge that there may be other barriers and facilitators experienced by clinicians from remote locations.

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Introduction

In 2019, colorectal cancer (CRC) was the second most commonly diagnosed cancer in Australia in men and women (9,069 cases and 7,329 cases, respectively).¹ In November 2017, Cancer Council Australia updated their guidelines for the prevention of CRC to recommend that all people aged 50-70 who are at average risk of CRC actively consider taking low-dose aspirin to reduce their risk of CRC.² Despite the publication of these national guidelines recommending a significant change in CRC prevention strategy, it has not been accompanied by an implementation strategy, rather relying on passive diffusion of the guidelines into clinical practice.

The new guidelines were endorsed by the National Health and Medical Research Council (NHMRC)

and adopted by the Royal Australian College of General Practitioners (RACGP). Meta-analyses of

- randomised controlled trials of low-dose aspirin have demonstrated reduced incidence and mortality from colorectal cancer by 25% and 33% respectively, as well as a 33% reduction in all-cause cancer
- mortality, when taken for at least 2.5 years.³ In addition to reducing the risk of colorectal cancer,
- aspirin also reduces the risk of cardiovascular disease (CVD) including myocardial infarctions,
- ischaemic strokes and transient ischaemic attacks by 6% per annum in primary prevention trials.⁴
- However, aspirin can cause side-effects including gastrointestinal haemorrhage, peptic ulcer and
- haemorrhagic stroke.
- This project aimed to explore clinicians', practices, knowledge, opinions, and barriers and facilitators
- to the implementation of these guidelines, with the intention of developing implementation methods
- to increase the uptake of aspirin for CVD and CRC prevention and reduce development of colorectal cancer in the Australian population.

Methods

Approach

- A qualitative case study using semi-structured interviews was conducted with a range of health
- professionals whom the new guidelines were most likely to directly impact, including
- gastroenterologists, geneticists, oncologists, genetic counsellors and general practitioners. A
- constructivist paradigm was used to generate new ideas from participants, using interviews to explore

current practice, knowledge and opinions toward recommending aspirin to people at average risk of

CRC and potential barriers and facilitators to implementing the guidelines.

Setting and sampling strategy

Recruitment was done through personal networks of the authors, as well as through social media posts, emailing through the Familial Cancer Centre (FCC) staff email list in the Parkville Precinct and cold calling general practices through the University of Melbourne's Department of General Practice Victorian Research and Education Network database. From these different sources of participants, we purposively sampled to achieve maximum variation in profession type, age, gender, years of experience and those working in both rural and urban Victoria, and public and private practice settings. As we sent out recruitment messages through different sources all participants opted in on their own. All participants provided written consent. General practitioners, as private practitioners, were reimbursed \$100 for their time as this group was the most difficult to recruit. Recruitment of all participants occurred between February and September 2019.

Data collection techniques

A semi-structured interview guide was developed based on the Consolidated Framework for Implementation Research (CFIR)⁵ (Table 1). CFIR is a conceptual framework developed to guide the

- assessment of implementation contexts. It consists of five domains and 39 constructs representing all
- areas of a healthcare setting that impact upon the successful implementation of a new intervention.⁶
- The five overarching CFIR domains covers aspects of the design and cost or the intervention

- 119 characteristics, aspects of organisations and how they operate in the inner setting, individuals within
- the organisations or characteristics of individuals like the culture and leadership, how outside
 organisations or outer settings and beliefs, and implementation processes impact upon successful
- ⁷ 122 implementation of an intervention.
- The interview questions were adapted from the online CFIR guide, which provides a list of potentially relevant interview questions for each of the constructs.⁵ In this study, the 'intervention' was defined as the national guideline recommending consideration of aspirin for CRC prevention. [Supplementary
- 12 126 Section 1].

The interviews were conducted by three researchers by authors SM, PA and TY who had no existing relationships with the participants. The interviewing researchers disclosed their position in the research to the participants and they were aware why the research was being conducted. Researcher SM who interviewed the general practitioners, geneticists, oncologists and genetic counsellors is a highly experienced female qualitative researcher. Researchers PA who interviewed pharmacists and TY who interviewed gastroenterologists both were male students who were trained in qualitative methods and supervised by experienced qualitative researchers (SM, JM, JE). Interviews were audio recorded and transcribed verbatim. Field notes on the time and location were recorded in researchers' notebook following the interviews. Researchers met regularly to review the interview transcripts and discuss data and the emerging themes. Interview transcripts were not returned to participants.

26 137 Analysis

- Qualitative transcript data were managed using NVivo 12^7 . The interviews for each type of participant; FCC staff, GPs, gastroenterologists and pharmacists were initially analysed separately. Complete coding of each interview was conducted by the author who interviewed the participant where everything that was spoken by the participants was organised into specific topics. At the first level of coding codes were produced inductively for each of the participant professional groups upon completion. For enhanced interpretive rigour, several interviews in each participant group were co-coded by another researcher and progressively checked in regular researcher meetings. The coding for several interviews per participant type was checked by a second researcher.
- After first-level coding, codes were grouped into themes. Thematic analysis was employed at this level where themes emerged from the first-level coding through discussions between the researchers. About 20 themes per professional group type were defined. Themes from each professional group type were discussed between the researchers and brought together if they could be. Themes were then mapped onto the domain and constructs from the CFIR⁶: characteristics of intervention, outer setting, inner setting, characteristics of individuals and process (Table 1).
- Table 1. Overview of the Consolidated Framework for Implementation Research. The CFIR provides constructs that have been associated with effective implementation.⁶

Characteristics of Intervention	Inner Setting	Outer Setting	Individuals Involved	Implementation Process
 Intervention source Evidence strength and quality Relative advantage Adaptability Trialability Complexity Design quality Cost 	 Structural characteristics Networks and communications Culture Implementation climate 	 Patient needs and resources Cosmopolitanism Peer pressure External policies and incentives 	 Knowledge and beliefs about the intervention Self-efficacy Individual stage of change Individual identification with organisation Other personal attributes 	 Planning Engaging Executing Reflecting and evaluating

1		Current formatting for publication in BMJ Open	
2 3	15/	Patient and public involvement	
4	154	No patient involvement	
5	155	No patient involvement.	
6 7	156	Results	
8	157	Sixty-four participants were interviewed (Table 2). Interviews ranged from 20	0-50 minutes and were
9	158	face-to-face in the participants place of work (clinic, pharmacy or hospital co	nsulting or meeting
10	159	room), except for four GPs who were interviewed over the phone. The resear	cher and participants
12	160	were the only ones present during the interviews, except for with pharmacists	if there were
13	161	shopkeepers or pharmacy assistants present. The results are presented accord	ling to the domains of
14	162	CFIR (Table 3).	·
15 16	163	Table 2. Characteristics of participants (N=64).	
17			
18		Characteristics	41
19		Sov. fomala (n)	41
20		Sex, leffiale (II) Profession (n)	55
21		Gastroenterologist	17
23		Pharmacist	14
24		General practitioner	16
25		Familial cancer on (FCC) staff	
26		Genetic counsellor	10
27		Geneticists	4
28		Oncologist	3
29		Years in profession (n)	
30		<10	23
32		10-19	22
33		20 – 29	8
34		30+ Work actting	11
35		General practice (%)	
36		Bulk-billing clinic	31
3/		Private	69
20 20		Hospital (gastroenterologists and FCC staff) (%)	0,
40		Public	77
41		Private	23
42		Pharmacy (%)	
43		Hospital	36
44		Community	64
45	164		
46 47	165		
47 48	105		
49			
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52			
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54 55			
55			

166	Table 3. Results of themes from interviews with; general practitioners (GPs), gastroenterologists, familial cancer clinic staff
167	(FCC staff), and pharmacists mapped onto the Consolidated Framework for Implementation Research.

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Characteristics of Intervention	Inner Setting	Outer Setting	Individuals Involved	Implementation Process
-The participants	- Participants	- As the guidelines	- Geneticists,	- Participants
expressed confusion	agreed that having	were first	pharmacists and	thought of
around the aspirin	limited time would	published by the	gastroenterologists	themselves as
dosing (100-300 mg)	be a barrier to	Cancer Council	saw their role as	early adopters but
	implementation as	Australia, they	advocates of the	agreed that it
-Some facilitators to	they are usually	were more	guidelines	takes time for
aspirin implementation	very busy	trustworthy	-	most clinicians to
included; the low cost,		-	- All clinicians	implement new
availability and safety	- Pharmacists	- The ASPREE	agreed that it is	interventions
	specifically saw	trial although it	GPs role to	
-The 'actively	their role to support	was a study done in	implement the	- Participants
considered' wording of	what the GPs	the elderly (70 –	guidelines into	agreed that
the guidelines implied	advise, and thought	80-year-old)	general practice,	patients would be
some uncertainty about	they should	population, it	GPs agreed it was	receptive to the
the strength of the	reiterate this to	introduced some	their role	recommendations
evidence	patients	hesitancy even for		
		the 50 – 70-year-	- FCC staff were	- A decision aid
-The aspirin guidelines		old population	aware of the	would be helpful
have changed over			guidelines, but	in facilitating a
time which presents as		- The guidelines	other clinicians had	discussion with
a barrier to		have changed a lot	limited knowledge	patients
implementation		over time for CVD		

29 168

1. Characteristics of the Intervention

170 Aspirin

Many participants expressed confusion regarding the dose of aspirin recommended for colorectal cancer prevention. While some participants were comfortable deciding on a dose within the 100 – 300mg range specified in the guidelines, others felt that this does range indicated uncertainty in the guidelines. (Quotations 1a and 1b)

- 175
 1a "Well I think the range is ambiguous there. The numbers are not ambiguous at all there I suppose but it's just it's out with normal practice I guess" General Practitioner, 30 years old
 - 177 1b "And I think the risk in data coming out is how much is useful, like the dosage. We used to
 178 think that a low dose used to be good for other cardiovascular events, but in fact maybe it
 179 isn't depending on gender, age and weight." Gastroenterologist, 47 years old
- Aspirin was perceived as cheap, safe and readily available by many participants, who stated this would facilitate their prescribing and patient uptake. With the rising costs of healthcare, participants thought the cheap nature of aspirin facilitated the implementation of the guidelines. (Quotation 1c) Barriers to implementation included concerns about possible side-effects of aspirin such as gastrointestinal bleeding and contraindications in people with multiple comorbidities. (Quotation 1d)
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 10 "It's cheap, which is the other thing; and, again, in the Australian healthcare system, where there are costs associated with a lot of treatments, to be able to recommend something that is - we're saying safe, the exception being the gastric irritation, and effective, and it's not going to break the bank for them to use it." General practitioner, 62 years
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 189
 10
 10 "And in terms of weighing up the side effects from aspirin, we've got the issue of the potential for those individuals who have got other comorbidities whether it's renal or

1		Current formatting for publication in BMJ Open
1 2		
3	191	allergies to aspirin or risk of stroke etc etc. You've got to weigh all those factors up before
4 5	192	you consider putting someone on aspirin" Gastroenterologist, 59 years old
6	193	CCA guideline
7	194	Many participants mentioned the specific phrasing of the guidelines, namely that aspirin should be
ð G	195	"actively considered". This language did not sufficiently encourage them to prioritise the
10	196	recommendation, and implied uncertainty about the strength of evidence. (Quotation 1e)
11	197	• 1e "Because it's not strong also perhaps that's something that will be its - not its downfall
12	198	but will be negative because we already have a lot of strong guidelines" Geneticist. 32 years
13 14	199	old
15		
16	200	2. Inner Setting
17	201	Despite the variety of specialities and workplace types, a common theme emerged of competing
18	202	(Quotations 2a, 2b) Bharmanists suggested they could support GBs in counselling patients, given GBs
20	203	have relatively short consultation times with their nations. Pharmacists commented on the closeness
21	204	of their location to GP clinics and their potential to reiterate advice about aspirin given by the GP
22	206	(Ouotation 2c)
23		
24 25	207	• 2a "I think time's our major challenge. There's just not enough time to especially that the
26	208	pace that endoscopy list goes is fast and I think in private it's much faster. Public, even then;
27	209	even if it's not pace, the patients had an andesthetic - it's not really an appropriate time to be talking to them about long term stuff." Gastroanterologist 50 years old
28	210	auking to them about tong-term stuff. Gustroenterologist, 50 years old
29 30	211	• 2b "So we only actually see people when we can offer genetic testing and the rest of our work
31	212	is done over the phone or we send letters. We are absolutely flat out at the moment. This is
32	213	probably the only time today I will be sitting and not running around." Genetic counsellor, 35
33	214	years old
34 35	215	• 2c "I think, we should, way of promoting it, and probably we should be more proactive with
36	216	it, GPs tend to not especially, one of the pharmacies I work at is next to a bulk billing clinic
37	217	doctors are very much get them in, get them out, and don't spend much time with them. so
38	218	that's where we can often come in to be that extra person that can either reinforce what the
39 40	219	doctor's told them or suggest other things. So, we should be there in the front line, yeah,
41	220	promoting nealth. Pharmacist, 50 years old
42	221	
43 44	222	3 Outer Setting
45	222	Cancer Council Australia was perceived as a trustworthy organisation and this gave greater weight to
46	223	and trust in the guidelines (Ouotation 3a)
47		
48 ⊿0	225	• 3a "Look as long as this is done by the Cancer Council of Victoria, I'm trusting them so it
50	226	depends who is it behind, but this is a credible source of information I would have hoped."
51	227	General Pracilioner, 38 years old
52	228	The initial results of the Aspirin in Reducing Events in the Elderly (ASPREE) Trial were published
53 54	229	after the Cancer Council Australia national clinical guidelines were released, and shortly before
55	230	interviews for this study were conducted. ⁸ The ASPREE trial showed low-dose aspirin provided no
56	231	benefit in participants aged 70-80 years over a short-term follow up of 4.7 years. ⁹ Some participants
57	232	in our study, despite varying degrees of knowledge of the ASPREE trial results, were hesitant to
58 50	233 22∥	recommend aspirin for people even in the 50 to /0-year-old group covered by the guidelines, due to the findings of the ASPREE trial despite being conducted in a different age schort (Quotations 2)
60	∠54 22⊑	and 3c)
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3b "So that negative study for aspirin in older patients; kind of makes me think- should I be giving it to someone with average risk of colorectal cancer?" Gastroenterologist, 32 years old • 3c "So there was a big study here in Australia, and then a little bit of input from the US done over the last few years, came out last year, the ASPREE study, so I did a talk on it, so I looked at the primary prevention of aspirin in the cardiovascular disease, and it showed that low-dose aspirin for healthy older adults had no impact on primary prevention and cardiovascular risk" Pharmacist, 26 years old Guidelines on the use of aspirin for disease prevention have changed over time, generating confusion among participants. Historically, aspirin was recommended for primary prevention of cardiovascular disease in certain at-risk patients, but guidelines were later altered, recommending it only for secondary prevention.^{10,11} Participants stated that it is hard to keep up with the latest recommendations, and that this ongoing change in advice caused reluctance to recommend them. (Quotation 3d) 3d "With aspirin, it was always for stroke prevention, and now they're turning around and saying no, we shouldn't be doing it for that! And you sort of wonder, well, is this going to be the same sort of thing? The, one of the issues with medications and guidelines as such is that they keep changing." Pharmacist, 50 years old 4. Characteristics of Individuals Whose role is it to recommend aspirin? Hospital-based clinicians generally supported the guidelines and saw their role as advocates rather than implementers of the guidelines. (Quotations 4a and 4b) All participants, including GPs, saw that the primary responsibility to implement the aspirin guidelines rested in primary care. (Quotations 4c and 4d) 4a "So, you know I'm a Geneticist. I think talking to GPs and Gastroenterologists would be a much better group [laughs] than Geneticists." Geneticist, 34 years old 4b "People are still very GP centred, so a lot of, even if we suggest things like this, a lot of people would still then go and talk to their GP before they decided to start something." Pharmacist, 50 years old 4c "If you understand what I mean, it's absolutely... I agree with those specialists, I do think it is part of the role of the GP to talk about these preventative health issues specifically prescribing aspirin" General practitioner, 28 years old 4d "It's interesting when new guidelines come out, because guidelines come out all the time, and this is a really - this is our bread and butter as a GP" General practitioner, 48 years old Knowledge / awareness of the CCA guidelines Knowledge and awareness of the guidelines was mixed. The FCC staff were more knowledgeable of the guidelines, specifically as they work with populations at increased risk of CRC, and awareness of recommendations about aspirin use in people with Lynch syndrome. Whereas GPs, pharmacists and gastroenterologists were either unaware or had limited knowledge of the guidelines. (Quotations 4e and 4f) 4e "All I know about low-dose aspirin in bowel cancer is that it can be used, but in certain populations, but beyond that, I actually really don't know." Geneticist, 32 years old

1 ว		
2 3 4 5 6	279 280 281	• 4f "I would say that going across, we have three different clinicians at work, and I don't think I've ever heard them recommend aspirin for someone who actually doesn't have something like Lynch syndrome." Genetic counsellor, 57 years old
7	282	5. Process
8	283	Implementation of the CCA guidelines
9 10	284	While most participants considered themselves as early adopters, they admitted that clinicians in
11	285	general would wait before adopting new clinical guidelines. (Quotation 5a) Most health professionals
12	286	agreed that patients would be receptive to taking extra medication such as aspirin for CRC prevention.
13	287	(Quotation 5b) Nevertheless, a decision aid was thought to be potentially useful to facilitate
14 15	288	discussion about the risks and benefits of taking aspirin. (Quotation 5c) Several participants could see
16	289	how they could discuss aspirin as part of their usual consultation. (Quotation 5d)
17 18 19	290 291	• 5a "Other doctors like to be on the tail end because they've been burnt a few times when things have kind of flipped back the other way." General practitioner, 38 years old
20	292	• 5b "You know. I think the people who already take tablets for something find it auite easy to
21	293	beguile an extra tablet. So, someone's already on a cholesterol tablet, they're on a high blood
22	294	pressure tablet, it's easy for them to add aspirin to that." Gastroenterologist, 60 years old
23 24 25	295	• 5c "Well that (a decision aid) might have been useful for the patient to show them what could
25 26	296	happen and how effective it is if they ask." General practitioner, 58 years old
27	297	• 5d "You know, I appreciate they're guidelines and they're not mandatory, and if it fits in with
28	298	the way I would practice, I'm happy to sort of incorporate them into what I do."
29 30	299	Gastroenterologist, 65 years old
31		
32	300	Discussion
33 24	301	This is the first study to our knowledge to examine the perspectives of a wide range of Australian
35	302	clinicians about recommending aspirin to reduce bowel cancer risk. Aspirin was considered as readily
36	303	available, affordable and safe. However, the ambiguity about the recommended dose and perceived
37	304	strength of the evidence was a concern for several clinicians. The media attention about the ASPREE
38	305	trial ¹² added to the perceived uncertainty about the evidence. Busy work environments meant limited
39	306	time to spend on prevention. The endorsement from Cancer Council Australia, a nationwide not-for-
40 ⊿1	307	profit organisation, meant the guidelines were perceived as trustworthy and therefore more likely to
42	308	be implemented.
43	309	FCC staff and gastroenterologists are generally aware of aspirin recommendations for patients at
44	310	increased CRC risk and suggested that GPs are better placed to discuss aspirin in those at average

- 45 311 risk. These hospital specialists felt they could advocate the use of aspirin but the ultimate
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 and the inspiral spectralists for the geodal dayoed on a spiral out the database of a spiral out th
- $\frac{47}{48}$ 313 the process but would not initiate discussions about aspirin. GPs agreed that this was part of their role,
- 49 314 for example when discussing bowel cancer screening, but had limited awareness of the guidelines.
- There is often a large investment of time, resources and clinical expertise involved in producing
 national clinical guidelines, however, there is typically no accompanying strategy to implement
 them.^{13,14} Between 2003 and 2007, 313 clinical practice guidelines were produced in Australia by over
 80 guideline producers¹⁵, but with limited clinical uptake. ^{16,17}
- The uptake of guidelines into clinical practice is influenced by several factors including the guideline
 characteristics, ease of implementation, clarity of the guidelines and individual clinicians' familiarity
 with the intervention and evidence.¹⁸ Our study highlights several of these factors which could act as
 barriers to widespread implementation of the aspirin guidelines. Superficially, one might expect

recommending a familiar, low cost, over-the-counter drug would be easily implemented. But lack of
 clarity, partly due to the specific wording of the recommendation, could alter perceptions of the
 evidence and jeopardise uptake of the guideline.

Uncertainties amongst clinicians about the evidence for aspirin in disease prevention is exacerbated by changes in recommendations about its use in cardiovascular disease. The Cancer Council Australia guideline specifically considered the evidence as it relates to preventing colorectal cancer. It did not discuss related evidence of reduced incidence and mortality from other cancers³ or for the primary prevention of cardiovascular disease.¹⁹ The US Preventative Services Taskforce recommends aspirin for CRC prevention only in people who are also at moderately increased risk of cardiovascular disease.²⁰ In addition, their recommendations about its use are stronger for people aged 50 to 59 years, compared with those aged 60 to 69 years because the risk of serious side-effects from aspirin increases with age.

There was little awareness amongst many participants of the additional effects of aspirin on all-cancer incidence and mortality, but this is an important additional consideration for patients when making informed decisions about taking aspirin. Clinicians in our study recognised the potential benefit of a decision aid to support discussions about taking aspirin. There is strong evidence to show that decision aids can support informed decision making, particularly when decisions require weighing up benefits and risks which are preference sensitive.²¹ Patients need to understand the potential benefits of aspirin in terms of reduced incidence and death from cancer and cardiovascular disease, and harms from gastrointestinal and intracranial haemorrhage. In a vignette study testing graphical approaches to communicating these harms and benefits from aspirin, over 70% of Australian patients aged 50-70 were willing to take aspirin for disease prevention.²² The use of a decision aid has the potential to inform the clinicians which addresses a major barrier to implementation, as GPs have limited awareness of the guidelines. A decision aid would enhance the clarity of the recommendation and facilitate a discussion about the aspirin guidelines with patients.

3334 348 Implications & limitations

In this in-depth qualitative study, we recruited a large sample of diverse participants representing different clinical disciplines, varied length of experience, and work settings. Although we recruited participants only from Victoria, we believe our findings are likely to be transferable to other Australian clinicians although we acknowledge that there may be other barriers and facilitators experienced by clinicians from remote locations.

The national guidelines on aspirin represent an important new approach to reducing the incidence and mortality of bowel cancer in Australia. But the absence of a strategic and more active implementation plan, means these guidelines are less likely to be translated into clinical practice.²³ Specific implementation strategies for general practice are necessary to increase the awareness and uptake of these guidelines. Our findings suggest that a stronger statement of recommendation and clarity about dosage are required. Engagement with pharmacists is also necessary to ensure they are aware of the guidelines and are prepared to endorse any advice from someone's GP about using aspirin. These implementation strategies could be supplemented by approaches to raise awareness in the community about the role of aspirin and decision aids to facilitate discussions between GPs and patients and support informed choices about CRC prevention.

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Author statement:

5 6 7	366 367 368	Conc SM, J JE. F	eption or design of the work: SM JM, FM, and JE. Acquisition, analysis or interpretation of data: JM, TY, PA, SS NK, PN. Drafting the work: SM. Critically revising the work: SM, SS, PL and inal approval of submitted version: all authors.				
8 9 10 11	369 370 371	Ethic Unive befor	es Approval: Ethical approval was provided by the Human Ethics Sub-Committee of the ersity of Melbourne (Ethics ID:1853266) and all participants provided informed written consent e taking part in this project.				
12 13 14 15 16 17 18 19 20 21 22	372 373 374 375 376 377 378 379 380	Twitter: Shakira Milton @ShakiraMiltonORCID IDs: Shakira Milton https://orcid.org/0000-0002-8510-6351Jennifer McIntosh https://orcid.org/0000-0002-6655-0940Thivagar Yogaparan https://orcid.org/0000-0003-3840-2999Pavithran Alphonse https://orcid.org/0000-0003-3840-2999Sibel Saya https://orcid.org/0000-0002-4796-6852Peter Nguyen https://orcid.org/0000-0002-8282-7663Phyllis Lau https://orcid.org/0000-0002-0665-6348Jon Emery 0000-0002-5274-6336					
23 24 25	381 382	Fund Centr	ling: This project was funded by a dedicated grant from the Victorian Comprehensive Cancer re Precision Prevention Program: VCCC 075739				
26 27 28	383 384	Data with 1	availability: Extra data can be accessed via the Dryad data repository at http://datadryad.org/ the doi:10.5061/dryad.g1jwstqq2				
29 30 31 32	385 386 387	Com devel cance	peting interests: JE and FM were members of the Cancer Council Australia guideline opment group which recommends the use of low dose aspirin for the prevention of colorectal er.				
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Supplementary Materials

Clinicians' opinions on recommending aspirin to prevent colorectal cancer to Australians aged 50 to 70 years: a qualitative study

S1. Interview schedule

Clinicians' interviews will be guided by the following schedule which only provides general areas to be covered.

**Remind them that you'll be recording the interview and START recording

DEMOGRAPHICS

• Age, gender, years of practice, specialization, place(s) of work: clinic(s) or hospital(s)

INTRODUCE CANCER COUNCIL GUIDELINES

(Show laminated version of summary / recommendations)

- Are you aware of the new guidelines? What is your understanding of the aspirin recommendations?
- Are you aware of guidelines that recommend prescribing aspirin to prevent bowel cancer?

OPINION ON GUIDELINES

- If aware of guidelines: what is your professional opinion of them?
- What are your thoughts underpinning the evidence around these guidelines?
- What do you think about using aspirin to prevent bowel cancer?
- Are you aware of the potential benefits and harms of using aspirin to prevent bowel cancer?
- Do you have clinical experience with the harms of using aspirin?

CURRENT PRACTICE/ PREVENTION

- When you consult with patients, what bowel cancer and cardiovascular disease prevention strategies do you incorporate into the consultation?
- Do you think this is part of your role as a general practitioner?
 - *If not:* whose role do you think it is?
- Do you currently recommend aspirin to patients?
- Which patients would you and would you not consider recommending aspirin to? Why?
 - Specific conditions, prevention?
 - How about those with or without a family history (e.g. Lynch syndrome)?

PATIENT OPINION

- What do think your patients would feel about using aspirin preventively?
- Have you had any feedback from patients about their experience of using aspirin preventively?

PATIENT EDUCATION

- How would you go about explaining the benefits and potential harms of taking aspirin?
- What supportive information would you use and why?

INTRODUCE EXPECTED FREQUENCY TREES

Show clinician the **2** expected frequency trees – **incidence** and **mortality**. Provide **evidence** for where the **numbers come from**. Emphasise it was developed for people aged **50-70**.

- What do you think about the EFT?
- Would the decision aid be helpful in these discussions with pts?

NEW GUIDELINE IMPLEMENTATION: ROUTINE PRACTICE

- Generally, when there is a new guideline, how do you find out about it?
- How do you incorporate new guidelines into practice?
- What challenges do you encounter when implementing new guidelines?
 - Private vs public
- How does your clinic/hospital implement new guidelines?
- Are you more likely to be early adopter or late adopter for new guidelines? Do you tend to wait to see what your colleagues are doing before starting to adopt new recommendations?

3

4 5

6

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript

where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript

accordingly before submitting or note N/A.

Торіс	Item No.	Guide Questions/Description	Reported on
			Page No.
Domain 1: Research team			
and reflexivity			
Personal characteristics			•
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with			
participants		<u>A</u>	•
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of	7	What did the participants know about the researcher? e.g. personal	
the interviewer		goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator?	
		e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation	9	What methodological orientation was stated to underpin the study? e.g.	
and Theory		grounded theory, discourse analysis, ethnography, phenomenology,	
		content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience,	
		consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail,	
		email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-	15	Was anyone else present besides the participants and researchers?	
participants			
Description of sample	16	What are the important characteristics of the sample? e.g. demographic	
		data, date	
Data collection			•
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot	
		tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	

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Торіс	Item No.	Guide Questions/Description	Reported o			
			Page No.			
		correction?				
Domain 3: analysis and						
indings						
Data analysis						
Number of data coders	24	How many data coders coded the data?				
Description of the coding	25	Did authors provide a description of the coding tree?				
ree						
Derivation of themes	26	Were themes identified in advance or derived from the data?				
Software	27	What software, if applicable, was used to manage the data?				
Participant checking	28	Did participants provide feedback on the findings?				
Reporting						
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings?				
		Was each quotation identified? e.g. participant number				
Data and findings consistent	30	Was there consistency between the data presented and the findings?				
Clarity of major themes	31	Were major themes clearly presented in the findings?				
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?				

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. International Journal for Quality in Health Care. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

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Title :	Standards for Reporting Qualitative Research (SRQR)* http://www.equator-network.org/reporting-guidelines/srqr/ and abstract	Page/line no(s).
Title :	http://www.equator-network.org/reporting-guidelines/srqr/ and abstract	Page/line no(s).
Title :	and abstract	Page/line no(s).
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_	Title Consists description of the nature and topic of the study identifying the study	
-	as qualitative or indicating the approach (e.g., ethnography, grounded theory) or	
	data collection methods (e.g., interview, focus group) is recommended	Page 1/ line 1-3
	Abstract - Summary of key elements of the study using the abstract format of the	
	intended publication; typically includes background, purpose, methods, results, and	Page 2/ line 35.62
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les ter a		
Intro	auction	Т
	Problem formulation - Description and significance of the problem/phenomenon	
Ļ	studied; review of relevant theory and empirical work; problem statement	Page 3/ line 75-90
	Purpose or research question - Purpose of the study and specific objectives or	
	questions	Page 3/ line 91-94
Meth	ods	
Γ		
	Qualitative approach and research paradigm - Qualitative approach (e.g.,	
	ethnography, grounded theory, case study, phenomenology, narrative research)	Page 3/ line 99
	and guiding theory if appropriate; identifying the research paradigm (e.g.,	Page 3/ line
F	postpositivist, constructivist/ interpretivist) is also recommended; rationale***	
	Researcher characteristics and reflexivity - Researchers' characteristics that	
	may influence the research, including personal attributes, qualifications/experience,	
	actual interaction between researchers' characteristics and the research questions	Page 4/ lines 120
	approach, methods, results, and/or transferability	- 126
Γ		
Ļ	Context - Setting/site and salient contextual factors; rationale**	Page 3/ line 105
	Sampling strategy - How and why research participants, documents, or events	
	were selected: criteria for deciding when no further sampling was necessary (e.g.,	
	sampling saturation); rationale**	Page 3/ line 104
Ē		
	Etnical issues pertaining to human subjects - Documentation of approval by an	Page 10 / line 345
	appropriate ethics review board and participant consent, or explanation for lack thereof: other confidentiality and data security issues	- 347

Data collection methods - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale**	Page 3/ line 113
Data collection instruments and technologies - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study	Page 4/ line 126
Units of study - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	Page 5/ line 143 and line 151
Data processing - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts	Page 4/ line 120
Data analysis - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale**	Page 4/ line 12 129/ line 131-138
Techniques to enhance trustworthiness - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale**	Page 4/ line 134- 135
ults/findings	

143 - 280
Page 5-8/ line 143 - 280

Discussion	
Integration with prior work, implications, transferability, and contribution(s the field - Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlied scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field) to r Page 8- 9/ line 282 - 327
Limitations - Trustworthiness and limitations of findings	Page 9/ line 334 - 340

Other

Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Page 10/ line 359 - 361
Funding - Sources of funding and other support; role of funders in data collection, interpretation, and reporting	Page 10/ line 357 - 358