Screening the CITY: optimizing population-based cancer screening in the Netherlands from a primary care perspective

Bongaerts, T.H.G.

Citation

Bongaerts, T. H. G. (2024, June 18). *Screening the CITY: optimizing population-based cancer screening in the Netherlands from a primary care perspective*. Retrieved from https://hdl.handle.net/1887/3764208

CHAPTER 6

Perceptions and beliefs of general practitioners on their role in the cancer screening programmes in the Netherlands: a mixed-methods study

Thomas H.G. Bongaerts
Frederike L. Büchner
Vera Nierkens
Matty R. Crone
Onno R. Guicherit
Mattijs E. Numans

Provisionally accepted, BMC Primary Care

Abstract

Background

In the Netherlands, population-based cancer screening programmes (CSPs) are organized aiming at cervical, breast and colorectal cancer. For a CSP to be effective, high participation rates are essential; however, there is an alarming downward trend, including wide regional variation in screening uptake. General practitioner (GP) involvement can have a stimulating effect on screening participation. Current GP involvement is however, limited, varies between the programmes and has changed over time. Unexplored is what GPs think of their role(s) in the CSPs. The aim of this study was therefore to map the perceptions and beliefs of GPs regarding their current and future role in the Dutch CSPs.

Methods

A mixed-methods sequential explanatory study was conducted in the Leiden/The Hague area of the Netherlands, between the end of 2021 and 2022. A questionnaire was developed and distributed among 110 GPs. The aggregated results obtained from the questionnaires served as starting points for conducting semi-structured interviews, with purposefully selected GPs. With this sequential approach we aimed to further enhance the understanding of the questionnaire data and delved into the topics that emerged from the questionnaire responses.

Results

In total, 46 GPs completed the online questionnaire (response rate 42%). Subsequent five semi-structured comprehensive interviews were conducted. GPs indicated that they frequently encounter the CSP in their daily practice and consider it important. They also emphasised it is important that GPs remain closely involved with the CSPs in the future. Nevertheless, GPs also repeatedly mentioned that they are not eager to take on more logistical/organizational tasks. They are however willing to empower CSPs in a positive manner.

Conclusion

GPs were generally positive about the CSPs and their current role within these programmes. Nevertheless, several options were proposed to improve the CSPs, particularly aiming to increase screening uptake among populations in socioeconomically disadvantaged positions. Since it is of utmost importance to screen those who are most at risk of developing the screening-specific tumours, efforts should be made to achieve this goal.

Introduction

The Dutch government invests considerable budgets, time, and effort in hosting three population-based cancer screening programmes (CSPs), aiming at cervical, breast and colorectal cancer (CRC). The goal of these screening programmes (SPs) is to detect cancer in an early or precursor stage. On average, this approach leads to a better prognosis, as well as fewer and less severe side effects of treatment.[1-3] The screening tests of the CSPs are offered free of charge by the Dutch government to all citizens of a specific age and gender. The National Institute for Public Health and the Environment (RIVM) and the national screening organisation (Bevolkingsonderzoek Nederland) are in charge of organizing and coordinating these programmes.[4, 5] Participation is voluntary and monitored yearly by the RIVM.[6-8] Although the three CSPs exhibit many similarities, each CSP has its unique procedures and organization, mainly due to differences in screening methods (see Table 1).

Table 1. Key characteristics of the population-based cancer screening programmes of the Netherlands

	CC-SP	BC-SP	CRC-SP
Since (year)	1979 (pilots from 1976)	1990 (pilots from 1984)	2014 (fully operational since 2019)
Population Age boundaries	30-60	50-75	55-75
Sex	F	F	F & M
Interval (years)	5	2	2
Screening test	HPV-test, if HPV positive then cytology (Pap-smear)	Mammography (bilateral)	Faecal Immunochemical Test (FIT)
General practitioner involvement	Performing pap-smear, discuss outcome, hospital referral[a]	Discuss outcome, hospital referral[b]	None[c]; discuss outcome
Screening outcome	HPV absent, present or unclear (re-testing). When applicable Pap-classification and HPV-typology.	Abnormality absent, abnormality present, not enough information (BI-RADS-code 0-5)	Negative (no examination needed), positive (examination needed), unclear (re-testing)
Financing Invitation, screening test(s) and analyses	Dutch government		
Secondary test(s) and treatment	Standard healthcare, hence depending on one's individual insurance policy		

CC= Cervical Cancer, BC= Breast Cancer, CRC= Colorectal Cancer, SP= Screening programme, F= Female, M= Male, HPV= Human Papillomavirus

[a] From 2017 onward, women can opt to receive a self-sampling test (after being invited). The outcome of the self-sampling test is not automatically shared with the GP due to privacy legislation. Outcomes will only be shared with the GP if it is explicitly stated that the GP is allowed to receive this information. Hence, the GP no longer plays an essential role in this CSP. If HVP is detected, women are recommended to contact their GP to have a smear test taken at the GP practice.
[b] In cases where no abnormalities are detected, the GP will not be involved.
[c] Since 2017, the GP no longer automatically receives the outcome of a FIT. Outcomes will only be shared with the GP if it is explicitly stated that the GP is allowed to receive this information. After a positive FIT patients are encouraged to seek contact with their GP.

High participation rates are essential for a CSP to be effective. According to the World Health Organization (WHO), at least 70% of the target population should be screened in order to be beneficial at the population level.[9-11] Throughout Europe participation in CSPs varies substantially, yet the Netherlands has always been known for its high screening attendance and adherence.[12] The most recent nationally available attendance rates – registered before the COVID-19 pandemic – were 56.0%, 76.0% and 71.8% for the SPs aimed at cervical, breast and CRC, respectively.[6-8] Although the attendance rates of two programmes are above the recommended rate from WHO, there is an alarming downward trend and wide regional variation in screening uptake.[13] In 2010, the uptake rates of the CSPs for cervical and breast cancer were 65.5% and 80.7%, respectively.[6, 7] Since the colorectal CSP has only been fully operational since 2019, it is too early to draw any conclusions on trends regarding this screening programme. The lowest attendance rates are found in the four large cities of the Netherlands and fall, for all three programmes, below the minimal intended rate of 70%.[4] This seems to coincide with a relatively higher incidence and related late-stage diagnoses in the same areas.[14] Hence, efforts should be made to optimize current screening uptake, especially for individuals who currently do not engage in the CSPs.

General Practitioner (GP) involvement is recognized for its ability to influence screening uptake, mostly by stimulating screening participation.[15-18] Within the Netherlands, GP involvement was earlier described as beneficial for the classical, ‘hard to reach’, subpopulations.[13] Thereby, the Dutch are known for placing trust in and maintaining good long-term relationships with their GPs.[19] Despite these factors, the extent of GP involvement in the CSPs remains limited, varies between the different programmes and has changed over time.[13] Unexplored is what GPs think of their role(s) in the CSPs. This study aims to fill this knowledge gap by mapping the perceptions and beliefs of GPs regarding their current and future role in the Dutch CSPs. With the long-term objective in mind that GP-involvement in the CSPs could potentially boost screening attendance.

Methods

Study design, recruitment of respondents and interviewees, and ethical considerations

We conducted a mixed-methods sequential explanatory study using questionnaires and semi-structured interviews to gain in-depth insight into the perspectives of GPs regarding their role in the Dutch cancer screening programmes (CSPs). This explanatory study is part of an overarching study in which we are trying to identify opportunities to optimize attendance rates for the CSPs.[20]

First, a survey was developed and distributed among GPs by using our Extramural LUMC Academic Network (ELAN). This is a network of GPs in the Leiden – The Hague area of the Netherlands, that aims to improve GP care in the region, including by supporting scientific research.[21] Over 100 GPs are closely linked to ELAN. These GPs were approached via a monthly newsletter between September and December 2021 (for a total of three times) and asked to fill out an online questionnaire. The invitation included background information about the study and a link to the online questionnaire. Second, for the succeeding interviews we again invited GPs via ELAN, but also activated other networks for recruiting GPs. For the interviewed GPs it was not necessary to have completed the previous questionnaire. We initially intended to purposefully select a diverse sample of interviewees within the ELAN GP-network – considering characteristics such as: sex, experience as GP, and neighbourhood (based on reported patient population characteristics) the GP was working in – however, due to time constraints and low response rates we changed to a convenience sample. The interviews were conducted partly face-to-face and partly online (i.e., video calls), based on the GP’s preference, between October and December 2022. The interviews were conducted, audio recorded and transcribed by TB, and checked by FB, VN and MC reading the transcripts.

Questionnaire

We developed a questionnaire containing 55 questions in total, on five different topics: (I) the CSPs in the GP-practice in general, (II-IV) the CSPs at cervical, breast and CRC specifically, and (V) three open-ended questions on the (future) role of the GP within the CSPs. Questions were on how often GPs encountered the CSPs in daily practice and on their thoughts concerning the CSPs. Most questions could be answered on a five-point rating scale ranging from strongly disagree to strongly agree. To test the comprehensiveness and clarity of the questionnaire, we piloted the questions among three potential study respondents upfront. Based on their feedback, we altered a few questions with minor language adjustments. The original questionnaire was in Dutch (translated version in the Supplementary File). Aggregated outcomes of the questionnaire, which were not traceable to individual responders, served as starting points for the interviews.

Interviews

Multiple semi-structured interviews were conducted using a thematic topic list, grounded on the outcomes of the questionnaire. Emerged topics from the questionnaire – described separately in the results section – were: (I) The current role and responsibility of GPs, (II) the informing of GPs (i.e., whether and how GPs are informed by the screening organisation, both on the patient’s screening status and screening outcomes), (III) the invitation procedures, (IV) the need for tailor-made strategies for subpopulations, and (V) suggestions for future other optimalisation of the current CSPs.

Analyses

As this study is explanatory, we derived the primary topics from the quantitative phase and utilized the qualitative data gathered from interviews to provide context for the quantitative outcomes. In the results section of this manuscript, the study outcomes are also presented in this sequential order.

Data generated by the multiple-choice questions of the questionnaire are presented descriptively, using counts and percentages. IBM SPSS (version 25) was used for analysing the data. To ensure an adequate number of cases in each category for analysis, we combined and coded the responses ‘agree’ and ‘strongly agree’ as ‘agreed,’ while ‘disagree’ and ‘strongly disagree’ were merged and coded as ‘disagreed’.

The transcripts, emerged from the interviews, were independently coded and labelled by TB and FB using a partially pre-composed code structure (open coding). Agreement on the codes was also reached between TB and FB. For each main topic, we conducted coding on the interviews to gain insights into how to interpret the quantitative data by incorporating qualitative information. The software Atlas.ti Scientific Software Development GmbH (version 7) was used for data storage, coding, and extraction of quotes for the topics. Quotes (Q) were originally in Dutch and were translated into English for this manuscript. The quotes presented in this paper were chosen based on their eloquence on a particular topic. For an overview of all quotes see Supplementary Table 1.

Results

After an online invitation of 110 GPs, a total of 46 GPs completed the online questionnaire (response rate 42%), with a mean age of 51 years (ranging from 36-68 years). Most of the respondents were female (72%) and had more than 10 years of working experience (85%). Twenty-six percent of the GPs, the largest group, were working in the greater city of The Hague. Most GPs described their population as average regarding age and educational level, and predominantly as having a Dutch cultural background (Supplementary Table 2). Subsequent five semi-structured interviews (convenience sample), ranging from 37-46 minutes, were conducted. The interviewed GPs had comparable characteristics to those of the questionnaire responders (Supplementary Table 3).

The cancer screening programmes (CSPs) were stated as an important and repeating topic in daily practice, and most GPs receive questions regarding the CSPs on a regular basis (Table 2). During the past year, 89% of the GPs received questions concerning the cervical CSP, 70% concerning the breast CSP, and 85% concerning the CRC-SP. Most questions, across all three CSPs, related to the outcomes of the screening test(s) and potential follow-up examinations, with particular emphasis on the self-sampling test for cervical CSP. GPs reported to be most familiar with the cervical CSP, regarding the objective and practice manual of the CSP, and their intended role. Only 69% of the GPs reported being familiar with their role regarding the CRC-SP, compared with 80% for the two other CSPs. Nevertheless, almost all GPs thought that their knowledge and practice policies were sufficient and accurate concerning all three CSPs. Nevertheless, the interviews revealed that GPs, on average, lack specific knowledge on various issues, including when the GP is informed and who is responsible for arranging the referral (Q3, Q21, Q49). Regarding the way GPs discuss and value the CSPs, approximately 80% of GPs indicated that they actively promote patient involvement in CSPs. Most GPs maintain a positive attitude toward patient participation, with 69% expressing the belief that encouraging cancer screening is always the appropriate course of action (Q8, Q16). Only 4% of the GPs occasionally discouraged patients from participating in a CSP. In the interviews it was explained that this occurred when patients struggled with extensive comorbidities or were already involved in (other) intensive medical trajectories. More than half (57%) of the GPs indicated that they mentioned the CSPs sometimes during consultation, even without the patient explicitly asking. From the interviews, it emerged that this was usually related to certain symptoms, such as: vaginal bleeding, a breast lump, or bowel related problems. Conversely, it also occurred that talking about the CSPs served as starting point for discussing other ‘intimate’ topics (Q16). Sixty-four percent of the GPs agreed that educating patients on the CSPs is part of their job. Most of the GPs (58% agreed, 16% neutral, 26% disagreed) thought that the final decision to participate in a CSP is an individual choice, and thus should primarily be left with the individual. Although GPs suggested several options to improve the current CSPs, they generally did not feel that the programmes are currently poorly arranged (Q49, Q55 Notably, during all the interviews, the current workload of GPs was repeatedly labelled as high (Q28, Q37, Q45).

Table 2. Quantitative outcomes questionnaire per CSP

	CC-SP	BC-SP	CRC-SP
Questions during last year	89% (n=45)	70% (n=46)	85% (n=46)
GP familiar with			
Objectives	76% (n=45)	71% (n=45)	72% (n=46)
Practice manual	54% (n=46)	53% (n=45)	54% (n=46)
Role	80% (n=46)	80% (n=45)	69% (n=45)
Sufficient knowledge GP	93% (n=46)	80% (n=44)	82% (n=45)
Accurate practice policy	95% (n=42)	N/A	N/A
In favour of inviting via GP practice	22% (n=41)	17% (n=41)	17% (n=42)
Wanting to know who was invited	54% (n=41)	39% (n=41)	49% (n=43)
Wanting to know who has a positive test	73% (n=40)	83% (n=40)	43% (n=37)
Willingness to inform patients after a positive test	75% (n=40)	78% (n=40)	61% (n=48)

(C)SP= (Cancer) Screening Programme, CC= Cervical Cancer, BC= Breast Cancer, CRC= Colorectal Cancer, GP= General Practitioner, N/A= not applicable

Topic I: Current role and responsibilities of GPs

When discussing their role, the interviewees expressed satisfaction and found it to be fitting. The programmes are seen as important, and for the GPs it makes sense that they are involved, at least for a part (Q14-16). As one interviewee mentioned (Q1): *"As GPs we have to be involved in the screening programmes. The contacts resulting from engagement are eminently suiting GPs. The programmes concern cancer, which always scares patients. This is thus an opportunity for us, where we can make a difference. Patients appreciate it when we are involved when we guide them along the way".* More than once, the CSPs were described as part of 'indicated prevention', and thus as a task for the GP (Q4, Q6). Regarding their wish to stay involved in the CSPs, GPs indicated that they like to stay involved, and in doing so they appreciate the close relationship they have with certain patients (Q2, Q7, Q9, Q10, Q12). When addressing the topic of responsibilities, GPs concurred that they are not responsible for screening uptake (Q5, Q11). However, in the case of a positive screening outcome for an individual patient, GPs do acknowledge a sense of responsibility. This is especially evident in guiding the patient and composing referral letters (Q13) (where the latter does not apply to the CRC-SP).

Topic II: Informing of GPs

GPs seemed to be divided regarding their preference for knowing the individuals invited by the screening organization. Approximately half of the questionnaire respondents were in favour of knowing this information, and some explicitly wrote this down in the open-ended question section. During the interviews, some stated they want to know all on attenders and non-attenders (GP IV and GP V), whereas others were more hesitant (GP I-III). This is illustrated by quotes 19, 23 and 25: *“I would like to know who did and did not participate. Now I have no clue, and therefore cannot act on it. If I knew, then I would be much better able to proactively engage with people concerning the CSPs”*, ‘versus’ quotes 18 and 20: *“I am not sure if I want to know when someone has not participated. It remains a patient’s own choice. Knowing this can be perceived as intrusive. ... Then, it may no longer feel like a free choice, but much more like coercion…”.* Several technical methods have been suggested to better inform GPs on screening attendance and outcomes; such as making use of the GP’s IT-systems (Q26), or by an opt-out based invitation system (Q27). By the latter, the interviewee meant that GPs receive information about patients’ CSP attendance by default, unless patients explicitly object. In the questionnaire, 73% of the respondents indicated that they want to know who had a positive screening outcome for the cervical CSP, 83% for the breast CSP, but only 43% for the CRC-SP. As became from the interviews, the lower percentage for the CRC-SP may stem from the perception that a positive Faecal Immunochemical Test (FIT, formerly the iFOBT) is considered less serious than a positive outcome in the other two CSPs. In addition, GPs were found to be less willing to inform patients after a positive FIT outcome. Finally, certain GPs interviewed expressed concerns that being aware of individuals who did not participate in the CSPs might result in an increased workload (Q17, Q22, Q24). They believed that this knowledge would entail additional responsibilities, such as actively reaching out to those who did not attend.

Topic III: Inviting via GP-practices

As in the past, screening-eligible people were invited via GP-practices for the cervical CSP, we questioned GPs on this topic. In the questionnaire 63% of the respondents declared they used to invite patients via their GP-practice for the cervical CSP, while 18% reported: ‘unknown to me’. Only a minority (20%) of GPs currently favoured inviting patients via GP-practices. During the interviews, none of the GPs appeared to be willing to (re-)start the invitation procedures primarily via GP-practice. Indicated reasons were mostly: lack of available time, or that their time could be better spent on other things (Q29, Q31, Q34). On the other hand, GPs also realized that the involvement of GP-practices would probably lead to a higher screening uptake (Q28, Q33, Q36). A kind of 'add-on methodology' where GPs can decide, maybe in agreement with the national screening organisation, to also invite patients themselves, so in addition to the general invitation, was considered as a possible positive proposal by all the interviewees. This idea was first introduced by GP I, Q30: "*Everyone is invited by default, but on top, GPs are given a list of high-risk screening-eligible people… You could be more creative than either just the entire invitation via the screening organisation, or via GPs".* And then later named by GP II (Q32): *"What could be done is a kind of 'add-on methodology'. So, in addition to a common basis, something extra can be done on the community-level by GP-practices. Think of a letter, or maybe even a call from the practice".* Such a methodology seems to be in line with Q35, which addressed that screening-eligible people currently do not feel seen individually. Another, less intrusive strategy, would be to send the invitation letter on behalf of the GP, or with an envelope that states that the GP supports the CSPs (Q33, Q36).

Topic IV: Tailor-made strategies for subpopulations/lower SES-neighbourhoods

By the GPs (I, III, V), working in more disadvantaged neighbourhoods, with a relatively lower socioeconomic status (SES), it was extensively discussed that tailor-made strategies are needed for specific subpopulations. As was stated (Q38): *"Given the complexity of participation, it is not surprising that people living in a low SES-neighbourhood and with a non-western migration background are less likely to participate. You have to do it all yourself, read it, understand it etc…".* Several barriers were considered to be especially relevant for people living in the lower SES-neighbourhoods, such as: the lack of (health) literacy, poor education and certain taboos. Furthermore, GPs reported that people living in disadvantaged neighbourhoods often have low trust in everything related to the government (Q44). We found no clear consensus on what these tailor-made strategies should look like (Q39-44). The earlier described 'add-on methodology' however, was thought to be effective increasing screening uptake for socioeconomically disadvantaged populations and was designated as positive by all GPs. Accurate information in several languages, and proactively approaching screening-eligible people were furthermore often mentioned as possibilities (Q39, Q40).

Topic V: Other optimalization opportunities

Numerous other optimalization opportunities for increasing participation were suggested in the open-ended questions of the questionnaire and by the interviewed GPs. Most of the idea's involved solutions as: making use of education videos on smartphones, pictograms, QR-codes and influencers (Q48, Q50, Q51). Furthermore, the waiting room information screen was suggested as a useful tool for informing patient on the CSPs

(Q53). Despite the various technological solutions, the majority of GPs also expressed a consensus that maintaining personal contact with a GP or GP practice should still be possible (Q52). GPs noted that they do not necessarily feel that a GP is required for these interactions. Instead, there was a greater emphasis on the appropriateness of involving a (specialized) practice-based nurse (Q46). Two GPs in particular addressed the funding concerning the CSPs and prevention in general (Q45, Q47, Q57): "*… the budget for primary care will truly have to increase substantially. We … actions within the system could then be funded much more easily".* Other suggestions involved (more) cooperation at both the regional as national level (Q56), and the training of medical students (Q58). One suggestion concerned the CRC-SP in particular. Multiple GPs observed that patients with a positive FIT are much more worried and anxious, than patients with positive outcomes at the other two CSPs. Therefore, they suggested that deeper clarification is needed on the meaning of the FIT for the public. This message should at least contain that a positive FIT, does not (immediately) equal CRC (Q54).

Discussion

This mixed-methods study aimed to map the role of GPs in the Dutch cancer screening programmes (CSPs), indicate that the CSPs are a regular topic during consultation hours and that GPs in general have a positive attitude towards the CSPs, and towards screening participation. GPs are most often consulted regarding the cervical CSP and the CRC-SP, and most questions are related to the outcomes of the screening tests and related follow-up examinations. The current role of GPs is generally evaluated as appropriate by GPs, and they would like to remain involved in the CSPs. GPs are not in favour of inviting screening-eligible people via their practices, or taking on more logistical/organizational tasks, but are willing to empower the CSPs. GPs agreed that they want to be informed on all positive test outcomes, but there was no consensus on knowing the participation status of all, nor all screening outcomes. Several options were proposed to improve the CSPs, particularly aiming to increase screening uptake among populations in socioeconomically disadvantaged positions.

To our knowledge, this is the first study to map in-depth the role of the GP regarding all three Dutch CSPs, and then specifically concerning perceptions and beliefs that GPs have about their role(s) and optimalization possibilities. Most of the current literature focusses usually only on one of the CSPs and GP involvement, related to screening uptake and/or GP attitudes. The findings of our study are consistent with these prior studies. As our findings indicate that GPs generally exhibit a positive attitude toward the CSPs, and they possess the ability to influence screening attendance rates.[15-18, 22-24] In addition, we found that GPs are aware of and willing to ensure that individuals with a potentially higher risk of developing the screening-specific tumours, who often live in relatively disadvantaged lower SES-neighbourhoods, participate in the CSPs. There is evidence in the literature that GPs are able to increase screening participation among people at higher risk, which was mostly achieved by approaching and inviting people selectively.[25, 26]

GPs were found to be most familiar with the cervical CSP, which is not surprising, since current GP involvement is most prominent in this CSP.[5] GPs seemed to be especially interested in CSP aiming at breast cancer, as they were most interested in knowing who had an abnormal mammogram and were most willing to discuss positive screening outcomes with patients themselves. This is likely related to how serious positive screening outcomes are valued by GPs. Earlier research described that GPs value a positive FIT outcome much less serious, than a positive mammography outcome,[27] as was also stated by several GPs included in our study. GPs appeared to be less familiar with the CRC-SP, which is most likely related to the novelty of the programme.[5] A study focused on the CRC-SP concluded that GPs should take on a 'guidance-role' concerning possible false-positive CRC screening outcomes.[28] Responding GPs in our study explicitly stated that they like such a 'guidance-role', and do see this as a GP's task. We therefore believe that such a guidance role of GPs could be applied to the entire portfolio of the CSPs.

Regarding our study there are certain issues which need to be reflected on. First, our questionnaire yielded a response rate of 42%, which is comparable with the results of other questionnaires searches among physicians.[29] With (online) questionnaires, there is always a potential risk of selection bias.[30] In our case, it could be that GPs who consider the CSP important participated in our study. However, as the results of the interviews align with the results of the questionnaire, we believe that we managed to minimize this risk. Second, during the interviews, we noticed that several GPs sometimes lacked parts of necessary background information to answer certain questions. For instance, most GPs assumed that they would always be informed when a patient had a positive FIT result; which is not the case (see Table 1). As described earlier, this constitutes an outcome of our study; yet it also impedes a more profound exploration of certain topics. For forthcoming studies, it could be crucial to consider that the average GP may not possess a comprehensive understanding of the organization of the CSPs. Third, during the interviews, it emerged that GPs had not always thoroughly considered their reasons for wanting certain information. For example, they regularly indicated that they wanted to know all on who had been invited, as well as on the outcomes of all screening tests. However, when we further probed into what they intended to do with this information, clear answers were not always provided. Fourth, for this study, we used a f convenience sample, due to logistical and time-related issues. Although most interviews yielded about the same answers, we cannot state that we achieved data saturation, as is often aimed for in qualitative studies.[31] Future (qualitative) studies are thus needed to clarify the above issues, which could also analyse possible differences in GP-specific characteristics related to outcomes. Lastly, as we conducted our study with GPs in (highly urbanised areas of) the Netherlands, our conclusions are primarily valid for Dutch GPs. GP involvement in the CSPs is however, not unique for the Netherlands,[15-18, 22, 24, 30, 32, 33] therefore we believe that interested readers (e.g., healthcare professionals and policymakers) from other (European) countries could also benefit from the insights gained from this study.

Based on the results of this study, we are confident that the future role of GPs can be optimised. One of the most cited concepts in the interviews was the idea of an ‘add-on methodology’ to increase current screening uptake, which might be particular suited for the more deprived neighbourhoods. This is in line with a more proactive, population/neighbourhood/community-oriented primary care approach and fits into the description of structured Population Health Management.[34] Such an ‘add-on methodology’ can be organised as a proactive tool, aiming to prevent adverse health events resulting from missing early screening opportunities in populations specifically at risk. A tool like this also responds to the concept of ‘trust’ in primary care and pays attention to people as individuals. Moreover, positive endorsement can be promoted by a GP practice. Another important, and recurring issue in the interviews was the currently increasing workload of GPs.[35] In our view, the prospect of getting even busier hinders potential innovations in primary care. This phenomenon is not desirable given all the challenges in the current healthcare landscape. We would therefore advocate that new innovations to optimise current CSPs should be implemented only in close consultation with GPs.

For the nearby future, we would like to challenge the national screening organisation, together with GP-practices, to determine whether such an ‘add-on methodology’ can be rolled out in several neighbourhoods, and to evaluate whether this approach is indeed effective for increasing current attendance rates among screening-eligible people, ideally for those at highest cancer risks. Considering the results of this study, it would be logical to establish a pilot study in the greater city of The Hague. The hope is that if GPs are more involved in the CSPs, they can especially educate and motivate people with potentially higher pre-existing risks of developing cancer to get screened. In this regard, attention must also be given to communication from GPs to potential participants, as it is known that the way of communicating influences perceptions on the CSP.[36] In this context, consideration can also be given to shared decision-making tools, where thought should be given to what can help involve individuals who are currently not participating in the CSPs. Recent research suggests that shared decision-making tools appear to be particularly useful for people belonging to socially disadvantaged groups. A prerequisite hereby is that there is sufficient time available for the consultation.[37] Ultimately, it is most important to screen those with the highest risk of developing the screening-specific tumours.

Conclusion

Our study indicated that the cancer screening programmes (CSPs) are a regular topic during consultation hours and that GPs judge this as a topic in which they like to stay involved. GPs are not eager to take on more logistical/organisational tasks but are willing to positively empower the CSPs and especially targeting subpopulations at highest risk. Several suggestions emerged from our study to further optimise the CSPs. A targeted proactive primary care approach was suggested as a desirable option.

Abbreviations

CRC: Colorectal Cancer; CSP: Cancer Screening Programme; ELAN: Extramural LUMC Academic Network; FIT: Faecal Immunochemical Test; GP: General Practitioner; RIVM: National Institute for Public Health and the Environment; SES: Socioeconomic Status; SP: Screening Programme; Q: Quotes; WHO: World Health Organization.

Ethics approval and consent to participate

Upfront, this study was approved by the Medical Research and Ethics Committee of the Leiden University Medical Centre (METC Leiden| Den Haag |Delft) (N21.040) and was conducted in accordance with the Declaration of Helsinki. All respondents and interviewees were informed about the aims of the study, its voluntary nature and anonymous data usage, before giving consent to participate. Prior to conducting the interviews informed consent was obtained of participating GPs.

Consent for publication

Not applicable.

Data availability

The datasets generated and/or analysed during the current study are not publicly available due to the size of the data and the qualitative nature of the data but are available in modified format from the corresponding author on reasonable request. Survey results are also available from the corresponding author upon reasonable request.

Competing interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this study.

Funding
This study was funded with support of the LUMC medical research profile Innovation in Health Strategy and Quality of Care.

Authors' contributions
All authors contributed to the design of the study and the interpretation of the data. TB, FB, VN and MR developed the questionnaire. TB performed the quantitative analysis in SPSS, supervised by FB. The interviews were conducted and transcribed by TB, and checked by FB, VN and MC reading the transcripts. Coding and labelling of the transcripts were independently done by TB and FB, agreement on the codes was reached between TB and FB. TB drafted the manuscript and FB, VN, MC helped drafting and revising the manuscript. OG and MN give their critical input on the final version of the manuscript. All authors have read and approved the final version of the manuscript.

Acknowledgements
We wish to thank all the general practitioners who participated in our study. Furthermore we like to thank both ELAN Research (www.elanresearch.nl) and Hadoks (www.hadoks.nl) for their help with the recruitment of general practitioners.

References

1. Gini, A, Jansen EE, Zielonke N, et al. Impact of colorectal cancer screening on cancer-specific mortality in Europe: a systematic review. European Journal of Cancer. 2020;127:224-35.
2. Jansen EE, Zielonke N, Gini A, et al. Effect of organised cervical cancer screening on cervical cancer mortality in Europe: a systematic review. European Journal of Cancer. 2020;127:207-23.
3. Zielonke N, Gini A, Jansen EE, et al. Evidence for reducing cancer-specific mortality due to screening for breast cancer in Europe: A systematic review. European journal of cancer. 2020;127:191-206.
4. Bevolkingsonderzoek Nederland. Jaarbericht 2020. Available from: https://www.jaarberichtbevolkingsonderzoeknederland2020.nl/. Accessed December 2022.
5. Rijksinstituut voor Volksgezondheid en Milieu. Population screening programmes 2021. Available from: https://www.rivm.nl/node/99391. Accessed December 2022.
6. Rijksinstituut voor Volksgezondheid en Milieu. Monitor Bevolkingsonderzoek Baarmoederhalskanker 2020. Available from: https://www.rivm.nl/bevolkingsonderzoek-baarmoederhalskanker/professionals/monitoring-en-evaluatie. Accessed November 2022.
7. Rijksinstituut voor Volksgezondheid en Milieu. Monitor Bevolkingsonderzoek Borstkanker 2020. Available from: https://www.rivm.nl/bevolkingsonderzoek-borstkanker/professionals/monitoring-en-evaluatie. Accessed November 2022.
8. Rijksinstituut voor Volksgezondheid en Milieu. Monitor Bevolkingsonderzoek Darmkanker 2020. Available from: https://www.rivm.nl/bevolkingsonderzoek-darmkanker/professionals/monitoring-en-evaluatie. Accessed November 2022.
9. World Health Organization. National cancer control programmes: policies and managerial guidelines: World Health Organization, 2002
10. World Health Organization. Cancer control: Early detection. WHO guide for effective programmes, 2007.
11. World Health Organization. Guide to cancer early diagnosis, 2017.
12. European Commission, Directorate-General for Research and Innovation, Group of Chief Scientific Advisors. Cancer screening in the European Union, 2022.13.
13. Bongaerts THG, Büchner FL, Middelkoop BJ, et al. Determinants of (non-) attendance at the Dutch cancer screening programmes: A systematic review. Journal of medical screening. 2020;27(3):121-9.
14. Bongaerts THG, Büchner FL, Munck de L, et al. Attendance characteristics of the breast and colorectal cancer screening programmes in a highly urbanised region of the Netherlands: a retrospective observational study. BMJ Open. 2023; currently under review.
15. Jensen LF, Mukai TO, Andersen B, et al. The association between general practitioners' attitudes towards breast cancer screening and women's screening participation. BMC cancer. 2012;12(1):1-6.
16. Twinn S, Cheng F. Increasing uptake rates of cervical cancer screening amongst Hong Kong Chinese women: the role of the practitioner. Journal of Advanced Nursing. 2000;32(2):335-42.
17. Rat C, Latour C, Rousseau R, et al. Interventions to increase uptake of faecal tests for colorectal cancer screening: a systematic review. European Journal of Cancer Prevention. 2018;27(3):227-36.
18. Federici A, Rossi PG, Bartolozzi F, et al. The role of GPs in increasing compliance to colorectal cancer screening: a randomised controlled trial (Italy). Cancer Causes & Control. 2006;17(1):45-52.

19. Brabers AEM DWN, Meijman HJ, De Jong JD. Wat beschouwen burgers als kernwaarden en kerntaken van de huisarts? Huisarts & Wetenschap. 2019.
20. Health Campus The Hague. *Screening the CITY*. 2018; Available from: https://healthcampusdenhaag.nl/nl/project/screening-the-city/.
21. Leids Universitair Medisch Centrum, *Extramuraal LUMC Academisch Netwerk (ELAN).* 2020; Available from: https://www.lumc.nl/over-het-lumc/partners/partners-in-de-zorg/extramuraal-lumc-academisch-netwerk-elan/. Accessed December 2022.
22. Benton SC, Butler P, Allen K, et al. GP participation in increasing uptake in a national bowel cancer screening programme: the PEARL project. British journal of cancer. 2017;116(12):1551-7.
23. Hermens RP, Tacken MA, Hulscher ME, et al. Attendance to cervical cancer screening in family practices in The Netherlands. Preventive medicine. 2000;30(1):35-42.
24. O'Connor M, McSherry LA, Dombrowski SU, et al. Identifying ways to maximise cervical screening uptake: a qualitative study of GPs' and practice nurses' cervical cancer screening-related behaviours. HRB Open Research. 2021;4.
25. De Nooijer D, De Waart F, Van Leeuwen A, et al. Participation in the Dutch national screening programme for uterine cervic cancer higher after invitation by a general practitioner, especially in groups with a traditional low level of attendance. Nederlands tijdschrift voor geneeskunde. 2005;149(42):2339-43.
26. Kant A, Palm B, Wentink E, et al. General practitioner based screening for cervical cancer: higher participation of women with a higher risk? Journal of Medical Screening. 1997;4(1):35-9.
27. Bertels L, van der Heijden S, Hoogsteyns M, et al. GPs' perspectives on colorectal cancer screening and their potential influence on FIT-positive patients: an exploratory qualitative study from a Dutch context. BJGP open. 2019;3(1).
28. van der Velde J, Blanker M, Stegmann M, et al. A systematic review of the psychological impact of false-positive colorectal cancer screening: What is the role of the general practitioner? European journal of cancer care. 2017;26(3):e12709.
29. Cook JV, Dickinson HO, Eccles MP. Response rates in postal surveys of healthcare professionals between 1996 and 2005: an observational study. BMC health services research. 2009;9(1):1-8.
30. Kelley K, Clark B, Brown V, et al. Good practice in the conduct and reporting of survey research. International Journal for Quality in health care. 2003;15(3):261-6.
31. Lucassen P, Greijn C. How to read a qualitative research paper? Nederlands Tijdschrift Voor Geneeskunde. 2018;162.
32. Panagoulopoulou E, Alegakis A, Mourad TA, et al. The role of general practitioners in promoting cervical cancer screening. European Journal of Cancer Prevention. 2010;19(2):160-6.
33. Giveon S, Kahan E. Patient adherence to family practitioners' recommendations for breast cancer screening: a historical cohort study. Family practice. 2000;17(1):42-5.
34. Steenkamer BM, Drewes HW, Heijink R, et al. Defining population health management: a scoping review of the literature. Population health management. 2017;20(1):74-85.
35. Landelijke Huisartsen Vereniging. Driekwart huisartsen vindt werkdruk te hoog, 2022. Available from: https://www.medischcontact.nl/nieuws/laatste-nieuws/nieuwsartikel/driekwart-huisartsen-vindt-werkdruk-te-hoog. Accessed December 2022.
36. Hersch, J.K., et al., *Improving communication about cancer screening: moving towards informed decision making.* Public Health Research & Practice, 2017. 27(3).
37. Herrera, D.J., et al., *Mixed-Method Systematic Review and Meta-Analysis of Shared Decision-Making Tools for Cancer Screening.* Cancers, 2023. 15(15): p. 3867.

Supplementary Tables

Supplementary Table 1. Quotes resulting from the interviews (n=5)

Topic	Number	GP	Quote
Topic I	Q1	I	As GPs we have to be involved in the screening programmes. The contacts resulting from engagement is eminently suiting GPs. The programmes are concerning cancer, which always scares patients. This is thus an opportunity for us, where we can make a difference. Patients appreciate it very much when we are involved, and when we guide them along the way. This should also be part of a GP's natural interest.
	Q2	I	It is important that a GP personally calls if a screening outcome is showing abnormalities. For patients it is a 'bad news call', women (people) are shocked by that. I think, that we as GPs should have these kind of conversations. Thereby, it is also handy; so we can keep track of our patients.
	Q3	I	It would help, though, to have even more clarity on what is expected of you as a GP with regard to the CSPs. Especially since it changes over time.
	Q4	I	We are talking about indicated prevention, this simply is part of the GP's job.
	Q5	I	I never really felt responsible for the CSPs, or at least not concerning the execution of the programmes. The initiative does not lie with the GP; it could only be, as maximum, a shared responsibility to meet certain targets. Then you will have to formulated a target together first; what do you want the minimum uptake to be?
	Q6	II	In my opinion indicated prevention, such as: smoking cessation, reducing obesity and cancer screening, is part of the range of tasks of a GP. This also makes sense since we know our patients and thus know on who we should focus.
	Q7	II	I want to be close to my patients. I like that, therefore I also decided to become a GP. For me it does not feel like an extra task to make an phone call regarding a positive CSP outcome. Patients really appreciate this too. It makes the work fun. So it is positive from two sides.
	Q8	III	I try to motivate patients, and if the screening outcomes return positive, then that they also participate in the follow-up tests. Most people are scared after getting a positive test-outcome.
	Q9	III	In my opinion, the CSPs are in essence not part of a GP's job. It is fine to be indirectly involved, but this is also enough. We already have so much other things to do. I would much rather leave this to others.
	Q10	III	Regarding the guidance of patients after an oncological diagnosis it very much depends on the patient to what extent I am involved. That is really tailor-made. But very often I am involved. I also really consider that as a task for myself, and for GPs in general.

Supplementary Table 1. Quotes resulting from the interviews (n=5) **(continued)**

Topic	Number	GP	Quote
	Q11	III	I am not responsible for ensuring people to participate. There also should not be any pressure either. If there would be any pressure, GPs will immediate quit cooperating.
	Q12	IV	I call patients myself when I am informed on a positive screening outcome. A (practice-based) nurse could also do this, but it is nice to take the lead in this as GP. It is an important outcome after all. I also like doing this. As a GP, you have a relationship of trust. It is about important things and it is really nice for patients to discuss this with someone they know. That familiar face just helps.
	Q13	IV	Whether people participate or not, therefore I am certainly not responsible. That is an individual choice. But as soon as there is a positive outcome and thing needs to be done (referral, guidance etc.), it also becomes a responsibility of the GP.
	Q14	V	We cannot afford, doing nothing in terms of prevention.
	Q15	V	Of course prevention is part of a GP’s job. In fact, it should be part of every consultation.
	Q16	V	I personally think discussing the CSPs is important. Mostly I recommend patients to participate in the CSPs. I also use this topic to talk about sexual health, intimate topics etc. So for me, it serves as a starting point for several issues.
Topic II	Q17	I	It is nice to know whether someone has, or has not, participated in the CSPs, including the screening outcomes. However, it remains a bit of a question what to do with this information. It would take a lot of energy if GPs had to start calling/inviting/motivating everyone who did not participate in the CSPs. On the other hand, it could make sense if the programmes really prove to be very effective, in terms of decreased cancer mortality.
	Q18	I	Things are a bit complicated, as non-attender you have not been able to give consent, whether your GP is allowed to know your participation status. So regarding privacy legislation several things should be sorted out.
	Q19	II	I do think I always want to know if a patient has a positive test. Especially when you are a practice owner and know your patients well. You can use this knowledge during your consultations. The context is very important and as a GP you can act on this.
	Q20	II	I am not sure if I would want to know when someone did not participate. It remains a patient’s own choice. Knowing this can be perceived as intrusive. I think it is not right when a patient decides to not participate, the GP then gets this messages and then contacts the specific patient. Then it may no longer feel like a free choice, but much more like coercion.

Supplementary Table 1. Quotes resulting from the interviews (n=5) **(continued)**

Topic	Number	GP	Quote
	Q21	III	Strange, you would expect that we as GPs have insight in all positive outcomes. In any case, I would like to know this. Then I am also able to monitor patients and maybe discuss the outcome when that specific patient comes by.
	Q22	III	I would not necessarily want to know who did not participate. Because if I know this, then I probably have to do something with this information.
	Q23	IV	I think we would like to have insight in all screening outcomes. Thus from all who participated. This would help us during consultation and in our relation with our patients.
	Q24	IV	I would be interested to know who did not participate, but actually I have never really thought about it before. I do think it will cost a lot of energy, if we then also have to do something with this information. So if, for example, we are expected/supposed to approach all the non-attenders. The time is just not there. If there is someone who can take over, then it might be interesting.
	Q25	V	I would like to know who did and did not participate. Now I have no clue, and therefore cannot act on it. If I knew, then I would be much better able to proactively engage with people concerning the CSPs.
	Q26	V	I want there to be a pop-up in my electronic patient management system. This year patient X will be invited for this CSP. Then I will able to check if they have participated and if not, I can discuss it with them. At present, I do not think it will be too much of an added workload. I would like to give it a try.
	Q27	V	I would like to see that on all surveys, patients can very clearly tick a box to share their attendance information with their GP. Or perhaps even better, vice versa. That such consent is basically regulated, unless...
Topic III	Q28	I	GPs are not waiting for more work, that is for sure. You would have to be well into the numbers to determine whether the invitation should be running via GPs (again). However, if the effect that the GPs can achieve is significant, that in, let say certain practices it saves half in terms of attendance, then, at least you should consider it. It should be a possibility if it is not running adequately in other ways.
	Q29	I	As a practice, we could start inviting potential participants ourselves (again). But then, at first it would require an estimate of how much effort this would be. You could also setup some extra assistance, which then also should be paid for.
	Q30	I	As an example: Everyone is invited by default, but on top, GPs are given a list of high-risk screening-eligible people whom you want to include in particular. You could be more creative than either just the entire invitation via the screening organisation, or via GPs.

Supplementary Table 1. Quotes resulting from the interviews (n=5) **(continued)**

Topic	Number	GP	Quote
	Q31	II	I do not think it is a good idea for GPs to start inviting. Because that is another extra task, besides, it means that we as GPs then have to take responsibility for this invitation procedures. This just has to run super smooth. We cannot have invitations not being sent, just because of some IT-failures. Or someone might not have changed their address and therefore did not receive an invitation.
	Q32	II	What could be done is a kind of 'add-on methodology'. So in addition to a common basis, something extra can be done on the community-level by GP practices. Think of a letter, or maybe even a call from the practice
	Q33	III	If you invite yourself as GP, you will probably get higher screening attendance rates. If people get a letter from an organisation they do not know, especially here in the neighbourhood, they very easily throw it away. There is a lack of trust, so to say. There is a lot of suspicion and distrust of what the government is and does. If the letter comes via the GP, or it says on the letter, "this letter is from your GP" then that will probably lead to a higher uptake.
	Q34	IV	I am not in favour of inviting myself. Right now it is well organised. We just do not have the energy and time. We already have enough things to do.
	Q35	V	People do not feel they are individually seen right now. That is also why they do not participate. This is a pity, because it could so easily be organized differently; i.e. by involving us as GPs more. We have also seen this with programmes aimed at cardiovascular risks and diabetes. If you provide individual attention, that will work. People appreciate it when they are looked after. People respond and flourish when you give them attention.
	Q36	V	I think it matters who sends the invitation letter. So whether it comes from a neutral organization/government, or via us, as GPs. This will have an effect on the screening uptake. In the past, we were involved in the invitation procedures, that worked incredibly well. It is a shame that that is no longer possible now.
	Q37	V	It is true, nowadays we have been appointed a lot of other tasks. Before, it was easy to be involved in the CSPs, but maybe now not anymore. This is also a political choice, what do we as a society want a GP to do? In addition, GPs are current busy because of the 'Purple Crocodile'. If only we could get rid of that, we would have time again to tackle really important issues. There is a desire for GPs to work more on prevention, look also at the Integral Prevention Agreement, but now it is hardly doable for us.
Topic IV	Q38	I	Given the complexity of participation, it is not surprising that people living in a low SES-neighbourhood and with a non-western migration background are less likely to participate. You have to do it all yourself, read it, understand it etc. You may wonder whether sufficient instructions are provided. There has been very little attention to enlighten this problem.

Supplementary Table 1. Quotes resulting from the interviews (n=5) **(continued)**

Topic	Number	GP	Quote
	Q39	II	Information in other languages is essential; but, I think it already exists. This should be included with the invitation(s).
	Q40	II	You could choose to go more into the neighbourhoods, to talk with people, and to activate peers more. Only of course, if low attendance is really perceived as a problem.
	Q41	III	There is not just a silver bullet, you will have to aim for different things. It often starts with proper education. In addition, there are probably also many other barriers that need to be addressed.
	Q42	III	In our neighbourhood, there is a curious paradox. On the one hand we see people who are very carcinophobic and hypochondriac, yet on the other hand, they seldomly participate in the CSPs. As GPs, we could respond to that quite well, if we were better engaged. Better screening uptake is in all our interests.
	Q43	IV	I do not believe anything has to change with respect to the invitation letter or procedure. I cannot remember a patient consulting me on these matters.
	Q44	V	In this neighbourhood, there is a distrust of everything which has to do with the government. People here also think: “government you have nothing to do with my ‘intimate’ health”. Those people then do not participate. I could really act on this as a GP. For many people here in the neighbourhood, the GP is still quite important. It matters what the doctor says. There are also people who do not participate because they do not like the tests, or because they are afraid they will not perform them in the right manner. I could really respond to this kind of barriers/believes.
Topic V	Q45	I	It would show political decisiveness to ensure that you can get by as a GP with a practice of, let say, 1.200 patients. Then, you will have time to do a lot of things and then these kinds of preventive tasks can be added much more easily. But then the budget for primary care will really have to increase substantially. We do not need to earn more as GPs, but actions within the system could then be funded much more easily.
	Q46	I	Within the practice, you could also appoint an assistant to specifically deal with the CSPs. This person could then answer questions about the CPS, perform Pap-smears, etc. Instruction videos in different languages would help too. However, the option to come to the practice, and to speak to someone should always remain possible.
	Q47	I	The GP is an easily accessible healthcare professional for a lot of people, and that is nice too. As a GP, you should also be able to continue like this, you should have time do provide these contacts. If there is a bit of extra funding for counselling potential participants, that would be really nice and would fit within current primary care.

Supplementary Table 1. Quotes resulting from the interviews (n=5) **(continued)**

Topic	Number	GP	Quote
	Q48	I	These days, I believe more and more in the possibilities of technology. Everyone has a smartphone. Everyone can watch films on it. This opens endless possibilities. More thought should be given to this.
	Q49	II	Actually, I do not think it is badly arranged now. Also the amount of GP involvement seems appropriate. What is however remarkable is the differences between the three CSPs. Why cannot just the screening organisation always make the referral, for example. Why do we as GPs still have to sit in between?
	Q50	II	I think language is often way too difficult. Language in itself can be a big problem. Written language is for many people difficult. There is a reason why 'thuisarts.nl' already has lots of videos. Besides, you should really use pictograms; and QR-codes for quick access to videos.
	Q51	II	Influencers on social media really make a differences these days, why not involve them?
	Q52	II	I think there are a lot of people who would like to talk with a healthcare professional about participating in the CSPs. GP practices would be a good place for that. It is often not just about facts and figures, but very often about trust. That is precisely where the GP (practices) can facilitate.
	Q53	III	Where you could do this in the GP's waiting room, by making use of the waiting room screen. That is an excellent place for education. Short, powerful, clear, straightforward, that works. We have had waiting room videos for years and really noticed that people learn something via this screen. People do need knowledge, but you have to really tailor it. The waiting room is pre-eminently a place where people can absorb medical information.
	Q54	III	Regarding the CRC-SP. I wonder if it is sufficiently clear to patients that this is not a test directly for cancer, but much more for its precursors. I would like people to be less shocked by the outcome. Nowadays, people are instantly worried they have cancer.
	Q55	IV	For now, most things are just fine. So then we should not want to change much. I am satisfied with how things are arranged.
	Q56	V	What I miss is cooperation. Everyone is always talking about this word. Also for the screening on cancer, it would help if healthcare providers and organizations cooperate. GPs, community centres, municipal health services, everyone is doing something, but not as a whole. We are working alongside each other. They/we are all little islands. Everyone is "helping", but who is really doing something? Where does the patient really benefit from in the end? In addition, we as GPs are really not valued properly by the current politics/government. We could really help, but are ignored. People will participate if we as GPs ask them to. In the process, this also undermines the credibility of the entire healthcare system.

Supplementary Table 1. Quotes resulting from the interviews (n=5) **(continued)**

Topic	Number	GP	Quote
	Q57	V	I would opt that health insurers collectively put 10% into a fund. This money could then be used to set up nationwide prevention projects.
	Q58	V	Finally, I really hope that we will educate the new medical students differently. Teach them about prevention.

GP= General Practitioner, (C)SP= (Cancer) Screening Programme

Supplementary Table 2. Characteristics of the questionnaire respondents (n=46)

		n	%
Age (years)	Mean: 51 (min-max: 36-68)	46	
Contractual hours	Mean: 37 (min-max: 20-60)	45	
Sex	Female	33	72
	Male	13	28
Experience as GP (years)	0-2	1	2
	3-5	2	4
	6-10	4	9
	10-19	20	44
	≥20	19	41
Location of practice (city/village)	The Hague	12	26
	Noordwijk/Leidschendam	10	22
	Alphen aan de Rijn	7	15
	Leiden	6	13
	Delft	5	11
	Zoetermeer	4	9
	Hoofddorp	2	4
Patient population (description)			
Age-range	Old (≥65 years) overrepresented	9	20
	Average distribution (all ages)	31	69
	Young (≤35 years old) overrepresented	5	11
Education	Higher education (university of applied sciences) overrepresented	8	18
	Average distribution	28	62
	Lower education (≤secondary vocational education) overrepresented	9	20
Cultural background*	Predominantly Dutch	32	74
	Predominantly from Western	4	9
	Predominantly from non-Western	7	16

GP= General Practitioner
*for definition see the survey attached as supplementary file (page 12)

Supplementary Table 3. Characteristics of the interviewed respondents (n=5)

		n	%
Sex	Female	3	60
	Male	2	40
Experience as GP (years)	0-5	1	20
	6-19	1	20
	≥20	3	60
Patient population (description)			
Age	Elderly (≥65 years) overrepresented	1	20
	Average distribution	3	60
	Young people (≤35 years old) overrepresented	1	20
Education	Higher education (university of applied sciences) overrepresented	1	20
	Average distribution	3	60
	Lower education (≤secondary vocational education) overrepresented	1	20
Cultural background*	Predominantly Dutch	3	60
	Predominantly from Western	0	0
	Predominantly from non-Western	2	40

GP= General Practitioner
*for definition see the survey attached as supplementary file (page 12)

Supplementary File (Questionnaire)

The general practitioner and the population-based cancer screening programmes
On experiences, wishes & ideas

Dear general practitioner, dear colleague,

The Health Campus The Hague is investigating how the current population-based cancer screening programs (CSPs) can be optimized. This because it appears that fewer and fewer people are participating in the CSPs.[1-3] For information on the overarching study, see the website: Screening the CITY

As a general practitioner you currently have varying tasks regarding the CSPs aiming at cervical, breast and colorectal cancer. We would like to ask you some questions about these different tasks. In addition, we would like to know whether you feel that certain aspects should be changed when it comes to your role as a GP regarding the CSPs.

We developed a short questionnaire and would like you to fill it out. Within 10-15 minutes you are able to share your experiences, wishes & ideas with us. Naturally, the information will be treated with confidentially and processed anonymously. Afterwards, we will publish the results on our website and use them for a scientific manuscript. We hope you are willing to fill out the questionnaire. As you will understand, the more completed questionnaires, the better the results will reflect on the collective thinking.

Thank you in advance for your cooperation.

Thom Bongaerts
GP trainee, PhD candidate
Health Campus The Hague
t.h.g.bongaerts@lumc.nl

Also on behalf of the other members of the research team:
Mattijs Numans, Onno Guicherit, Frederike Büchner, Vera Nierkens & Matty Crone

---

1. Rijksinstituut voor Volksgezondheid en Milieu. Landelijke Evaluatie & Monitoring Bevolkingsonderzoeken. https://www.rivm.nl/
2. Bevolkingsonderzoek Zuid-West. Jaarverslag 2019. https://www.bevolkingsonderzoeknederland.nl/media/1442/jaarverslag-2019_def.pdf
3. Bevolkingsonderzoek Midden-West. Jaarverslag 2019. https://www.bevolkingsonderzoeknederland.nl/media/1404/126-200005-jaarverslag-2019-def_hr.pdf

List of abbreviations

CSP	Cancer screening programme
BC-SP	Cancer screening programme aiming at breast cancer
CC-SP	Cancer screening programme aiming at cervical cancer
CRC-SP	Cancer screening programme aiming at colorectal cancer
FIT	Faecal Immunochemical Test (screening test CRC-SP)
GP	General Practitioner
hrHPV	High risk human papillomavirus
NHG	Dutch College of General Practitioners
Pap-test	Papanicolaou test (screening test CC-SP)

Below are a number of statements and questions. Please choose the answer most applicable to your situation in each case. We would like you to complete all statements and questions. Comments and remarks can be made on the last page.

I. The CSPs in the general practice

Following are a number of statements and questions about to which extent you deal with the cancer screening programmes (CSPs) on a daily basis. In each case, please choose the answer that best suits your situation.

1. Patients come to the GP-practice (to me as GP and/or to the practice assistants) with questions about the CSPs.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

2. The questions I get about the CSPs are (multiple answers possible):
   ○ mostly on the CSP aimed at cervical cancer (CC)
   ○ mostly on the CSP aimed at breast cancer (BC)
   ○ mostly on the CSP aimed at colorectal cancer (CRC)
   ○ not applicable; I don't get any questions about the CSPs

3. In the past year, have you encouraged patients to participate in the CSPs?
   ○ yes
   ○ no

4. In the past year, have you advised patients <u>against</u> participating in the CSPs?
   ○ yes
   ○ no

5. Do you ever bring up the CSPs without a patient explicitly asking about these programmes?
   ○ yes
   ○ no

Following are a number of statements on the several tasks you have as a GP. Please choose the answer that best suits you.

1. I think providing information about the CSPs is part of my job as GP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

2. I think I should encourage participation in the CSPs.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

3. I feel that I should leave the choice to participate in the CSPs mainly with the patient.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

4. I feel I should only discuss the CSPs when the patient has specific questions regarding the screening programmes.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

II. Specific questions about the CSP aiming at cervical cancer

Following questions concern your role and that of the practice assistant(s), regarding the CSP aiming at cervical cancer (CC-SP). In each case, please choose the answer that best suits you.

1. In the past year, have you (or any of your practice assistants) had any questions about the CSP aiming at CC?
   ○ yes
   ○ no; you can proceed to question 3

2. What were the questions about (multiple answers possible):
   ○ the invitation
   ○ participation in the CSP
   ○ the risk of developing cervical cancer
   ○ the outcome of the (screening) test
   ○ the self-test
   ○ follow-up examinations
   ○ participation at the follow-up examinations

Following statements are about your experiences with the CSP aiming at cervical cancer (CC-SP). Please choose the answer that best suits you.

3. I am well informed about the content and objectives of the CC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

4. I am aware of the NHG practice manual on the CC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

5. I know what my role is regarding to the CC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

6. I have sufficient knowledge to explain about the CC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

7. In the practice where I work, we (GPs and practice assistants) know how to perform PAP-tests according to the CC-SP guidelines.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

Following questions and statements are about your vision of the CSP aiming at cervical cancer (CC-SP). Please choose the answer that best suits you.

In the past, invitations to participate in the CC-SP were sent via GP practices. The national participation rate was at the time higher.

8. Were women in your practice actively invited to participate in the CC-SP in the past?
   ○ yes
   ○ no; you can proceed to question 10
   ○ unknown to me; you can proceed to question 10

9. Since women are no longer invited via GP practices, I noticed that fewer women are participating in the CC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

10. I (again) would like to have the possibility to invite women for the CC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

11. I want to know which of 'my' patients were invited for the CC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

For the CC-SP, the possibility of using the hrHPV (high-risk human papillomavirus) self-test exists since 2017. As a result, it is no longer necessary for women to have a smear test taken at the GP practice, but women can independently test for hrHPV. The GP does not receive the outcomes of a self-test .This is in the context of privacy legislation. If hrHPV is found with the self-test, a woman is advised to have a smear taken at the GP practice. This smear is then cytologically assessed.

12. As a GP, I always want to know if a patient has taken a self-test as part of the CC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

13. When women receive a positive screening outcome, I want to be able to inform them myself.
    ○ strongly disagree
    ○ disagree
    ○ neutral
    ○ agree
    ○ strongly agree

Depending on the outcomes of the screening test, the GP is still involved by partaking a control smear after 6 months, or by referring the women to a gynaecologist for follow-up examinations.

The GP will always be informed about outcomes emerging from the follow-up examination(s).

III. Specific questions about the CPS aiming at breast cancer

Following questions concern your role regarding the CSP aimed at breast cancer (BC-SP). In each case, please choose the answer that best suits you.

1. Have you had any questions about the BC-SP in the past year?
   ○ yes
   ○ no; you can proceed to question 3

2. What were the questions about (multiple answers possible):
   ○ the invitation
   ○ the invitation interval (actual since Covid-19)
   ○ participation in the CSP
   ○ the risk of developing breast cancer
   ○ the outcome of the (screening) test
   ○ follow-up examinations
   ○ participation at the follow-up examinations

Following statements are about your experiences with the CSP aiming at breast cancer (BC-SP). Please choose the answer that best suits you.

3. I am well informed about the content and objectives of the BC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

4. I am aware of the NHG practice manuals on the BC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

5. I know what my role is regarding the BC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

6. I have sufficient knowledge to explain about the BC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

Following statements are about your vision of the future regarding the CSP aiming at breast cancer (BC-SP). Please choose the answer that best suits you.

7. I want to know which women from my practice, have been invited for the BC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

8. I want to be able to invite women for the BC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

As GP, you will be involved in the BC-SP when follow-up examinations are needed as a result of the mammograms. As GP you need to refer the specific women to a hospital for further analysis. This may be because the X-rays are not conclusive, or if the X-rays show abnormalities.

9. As a GP, I always want to know if a patient has had a mammogram as part of the BC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

10. When women gets an abnormal screening outcome, I want to be able to inform them myself.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

The GP will always be informed on the outcomes following the follow-up examination(s).

IV. Specific questions about the CSP aiming at colorectal cancer

The following questions are about your role at the CSP aiming at colorectal cancer (CRC-SP). Please choose the answer that best suits you.

1. Have you had any questions about the CRC-SP in the past year?
   ○ yes
   ○ no; you can proceed to question 3

2. What were the questions about (multiple answers possible):
   ○ the invitation
   ○ participation in the CSP
   ○ the risk of developing colorectal cancer
   ○ the outcome of the (screening) test
   ○ follow-up examinations
   ○ participation at the follow-up examinations

The following statements are about your experiences with the CSP for colorectal cancer (CRC-SP). Please choose the answer that best suits you.

3. I am well informed about the content and objectives of the CRC-SP.
   ○ strongly disagree
   ○ disagree
   ○ neutral
   ○ agree
   ○ strongly agree

4. I am aware of the NHG practice manuals on the CRC-SP.
   - ○ strongly disagree
   - ○ disagree
   - ○ neutral
   - ○ agree
   - ○ strongly agree

5. I know what my role is regarding the CRC-SP.
   - ○ strongly disagree
   - ○ disagree
   - ○ neutral
   - ○ agree
   - ○ strongly agree

6. I have sufficient knowledge to explain about the CRC-SP.
   - ○ strongly disagree
   - ○ disagree
   - ○ neutral
   - ○ agree
   - ○ strongly agree

Following question and statements are about your vision on the future of the CSP aimed at colorectal cancer (CRC-SP).Please choose the answer that best suits you.

7. I would like to know who participated in the CRC-SP.
   - ○ strongly disagree
   - ○ disagree
   - ○ neutral
   - ○ agree
   - ○ strongly agree

8. I would like to be able to invite patients for the CRC-SP myself.
   - ○ strongly disagree
   - ○ disagree
   - ○ neutral
   - ○ agree
   - ○ strongly agree

Since January 2017, GPs are no longer automatically notified on the outcomes of the FIT; the primary screening test for the CRC-SP. This is in the context of privacy legislation. Participants must give explicit consent for sharing information regarding the FIT. In case of a positive FIT outcome, a patient receive an appointment for follow-up testing by the screening organization. Patients are advised to contact their GP if they receive a positive FIT outcome.

9. Were you aware of this change?
   ○ yes
   ○ no

10. As a GP, I always want to know whether a patient has submitted an FIT as part of the CRC-SP.
    ○ strongly disagree
    ○ disagree
    ○ neutral
    ○ agree
    ○ strongly agree

11. As a GP, I always want to know if a patient had a positive FIT.
    ○ strongly disagree
    ○ disagree
    ○ neutral
    ○ agree
    ○ strongly agree

11. When patients from my practice receive a positive screening outcome, I want to be able to inform them myself.
    ○ strongly disagree
    ○ disagree
    ○ neutral
    ○ agree
    ○ strongly agree

The GP will always be informed about outcomes following the follow-up examination(s)

Descriptive characteristics

Finally, a few questions about you as a GP, and the place where you work.

1. What is your year of birth?

2. What is your gender?
   ○ male
   ○ female

3. What kind of professional appointment do you have?
   ○ practice owner
   ○ employed GP (at a permanent practice)
   ○ acting general practitioner

4. What are the first 2 digits of the zip code where you work as a GP? (if you are an acting GP, please enter the postcode of the practice where you most often work)

5. How many years of work experience do you have as a GP?
   ○ 0-2
   ○ 3-5
   ○ 6-10
   ○ 10-20
   ○ 20+

6. On average, how many hours per week do you work (contract hours)?

7. How would you describe your patient population with respect to age distribution?
   ○ elderly (≥65 years) overrepresented
   ○ average distribution
   ○ young people (≤35 years old) overrepresented

8. How would you describe your patient population with respect to level of education?
   ○ higher education (university of applied sciences) overrepresented
   ○ average distribution
   ○ lower education (≤Secondary vocational education) overrepresented

9. How would you describe your patient population with respect to cultural background?
   ○ predominantly from a Dutch background
   ○ predominantly from a Western-migration background. (Countries in Europe, North America, Oceania, Indonesia and Japan; excluding Turkey)
   ○ predominantly from non-Western migration backgrounds. (countries in Africa, Latin America and Asia (excluding Indonesia and Japan) or Turkey)

V. Open questions

1. Do you have any general comments regarding this questionnaire?

2. Do you think GPs should have a role regarding the CSPs? If so, how do you think that role should look like?

3. Are there any other things you would like to add which have a relation with the CSPs, and/or could possibly be of additional value to our research?

Thank you very much for your participation!