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

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CHAPTER 7

General discussion

The overall aim of this thesis was to identify cues that may contribute to optimizing the current attendance rates of the cancer screening programmes (CSPs) in the Netherlands, with a focus on the potential role of primary care. We hypothesised that the CSPs that currently handle a ‘one-size-fits-all’ approach, with a limited role for primary care and general practitioners (GPs), should shift to a more targeted approach for subpopulations at relatively higher risk, with sophisticated involvement of primary healthcare providers and healthcare centres to support such a new approach. In this final chapter, the study findings are outlined and discussed in relation to each other. First the key findings of the studies in this thesis will be presented. Then, we will look back at the case of the Janssen family and discuss the methodological considerations of this thesis. Thereafter, the implications of our findings and recommendations for future research will be discussed. Finally, the overall conclusion based on this thesis will be presented as a reflection on our hypothesis.

Main findings

Reviewing the literature in **Chapter 2**, shows that thus far published studies tend to describe the well-known and general characteristics of (non-)attenders, but rarely provide in-depth information on other factors that may influence participation. Non-influenceable determinants as a non-Western migration background, living in a highly urbanised area and with a lower socioeconomic status (SES) background, were most often described as being associated with low(er) cancer screening attendance. Our findings in **Chapter 3** also suggest that non-attendance at the cancer screening programmes (CSPs) aiming at breast and colorectal cancer in a highly urbanised area, is linked to living in lower SES-neighbourhoods. Additionally, it is associated with a more unfavourable tumour-stage at diagnosis. In **Chapter 4** we present evidence that beliefs and motivations towards the CSPs and CSP attendance are not only different between attenders and non-attenders, but can also differ between subgroups of people holding different perspectives. We identified three different perspectives. Responders holding one specific perspective – those doubting screening attendance and anticipating the potential consequences of the screening results – were in particular open to receive information provided by a general practitioner (GP), or another trusted primary healthcare provider. **Chapter 5** can be seen as a ‘proof of concept’ study, in which we showed that a targeted proactive primary care approach for a subpopulation at relatively higher risk on the development of (in this case: cervical) cancer, is needed – sometimes even essential – to enhance screening. In **Chapter 6** we concluded that GPs are generally positive about the CSPs and are willing to positively empower the CSPs. The GPs involved suggested several options to improve the current CSPs, especially to increase screening uptake for populations in a socioeconomic or otherwise socially disadvantaged position.

The story of the Janssens family – The Answers

In his search for answers the GP found that it would still be wise for Sarah to participate in the cervical cancer screening programme (CSP). Furthermore, he understands that participating in a CSP can also have some potential harms. He learns that deciding on participation in a CSP is not always an easy choice, and that some people are not capable of deciding on participation, because they lack certain knowledge, or experience certain kinds of (access)barriers. The GP experiences that his role is different between the different programmes and varied over the course of preceding years. The GP's quest for information yields the following results.

For many people cervical cancer is linked to being sexually active. While this is not completely untrue, prominent and persistent misinterpretation of the association may discourage people from attending the cervical CSP.¹ Regarding the human papillomavirus (HPV) vaccination campaign, similar effects have been described.² To a certain extent, Sarah is right that she is less likely to be infected with HPV if she has had one and the same boyfriend for a long time. Nevertheless, the virus may be contracted by her boyfriend long before or during their relationship, wherefore it still would be best for Sarah to get screened on HPV.³

Even if Sarah was vaccinated for HPV, it would be wise for her to participate in the CSP, since vaccinating is not 100% effective.³ Luckily HPV-testing can be done easy and quick via a self-sampling test, which has been validated to be used by every woman and nowadays is seen as an equal alternative,⁴ or by getting a Pap-smear done at a GP-practice.⁵ Earlier the Dutch Health Council advised to send the HPV self-sampling test along with the invitation as standard.⁶ Recently this advice was adopted by the minister of Health. These days only women who are invited for the very first time (at 30 years of age) receive a self-sampling test immediately with the invitation. From the second invitation onwards, women can ask for the self-sampling test, or it will be sent along with the reminder letter after 12 weeks.⁷

The rationale behind the CSPs is that participation will lead to overall early-stage cancer diagnoses, better treatment options and a better outcomes. The harms of the CSPs are however lesser known; not only by the public, but also by some healthcare providers.^{8,9} Potential harms of attending the CSPs can be best summarized as: (I) overdiagnosis and overtreatment; (II) false-positive screening results; (III) underdiagnosis and undertreatment, caused by a false-negative screening result, and (IV) causing certain physical and psychological side-effects, due to the used screening test(s).¹⁰

Given these harms, there are numerous reasons why people refrain from participation. The GP in this case however, also finds out that deciding on CSP attendance is not always a matter of purely rational decision-making.¹¹⁻¹⁴ Similar to John's situation there are many people who do not understand the invitation or do not have a clue about the CSPs at all. In this regard, our GP develops the opinion that primary/GP-care has a pivotal role in providing guidance and information for potential participants concerning the CSPs.

Because the GP believes that John may have a higher risk of developing colorectal cancer, he contacts the family.

Methodological considerations

In this thesis all three Dutch cancer screening programmes (CSPs) are examined and discussed, taking the differences and similarities of the programmes into account, over a longer period of time. The presented studies in this thesis can all be regarded as building blocks that improve the evidence needed for the *Screening the CITY* project, in which we aimed to explore and resolve specific problems that come up in highly urbanized areas when the CSPs were implemented and seem to be underused.

The individual studies conducted in this thesis employed a diverse range of research methodologies and focused on different study populations. By utilizing varied research methodologies and study populations, we intended to overcome potential limitations of each sub-study, as discussed in each chapter. In two studies (see Chapter 2 and 4), we made use of the Integrated Change Model as a comprehensive theoretical framework to enhance our understanding of screening participation.^{15, 16}

Some of the studies in the *Screening the CITY* project were conducted different than originally intended. This was mainly due to the outbreak of the COVID-19 pandemic and its associated effects. At the peak of the pandemic the CSPs were temporally suspended, and over the course of the pandemic, screening organisations understandably prioritized other pressing matters over facilitating scientific research.^{17, 18} This led to several modifications to our studies, and had in particular impact on the studies described in Chapter 3 and 4.

Concerning the research presented in **Chapter 3** we encountered an issue where we were unable to access the data on cervical CSP. Consequently, we were unable to combine data on all three cancer screening programmes in the city of The Hague. It transpired that the data on this screening programme resided within a separate data

infrastructure, which was not readily accessible for research purposes at the time. This fragmentation – where collections of data are scattered across various locations, resulting in numerous datasets distributed across multiple servers – hinders the possibility of interconnection and smooth exchange of data, but appears to be not unique concerning our study.¹⁹ Furthermore, the original idea for this study was to enrich our datasets – containing information on individuals' participation status and cancer incidence rates – with supplementary data from Statistics Netherlands (CBS; Centraal Bureau voor de Statistiek) to obtain a more comprehensive understanding of determinants affecting cancer screening attendance. Unfortunately, not all parties involved agreed to share their data, so we were not allowed to set up straight forwardly pseudonymized data linkage procedures as we had originally planned. From literature it appears to be a recurring challenge in Dutch studies, where data linkage problems appears to be commonly encountered.^{20, 21} The General Data Protection Regulation (AVG; Algemene Verordening Gegevensbescherming) is then mostly cited, which would not allow re-use and/or data linking.²¹ This is regrettable, since from the perspective of (I) the patient, (II) the researcher, (III) the quality assessor, but also (IV) the healthcare professional, there are multiple arguments why linking, sharing and re-using of (medical) routinely collect data is desirable.²² With regard to the data retrieval and linkage issues, the Netherlands underperforms when compared with other countries in Europe.^{23, 24} For patients, sharing of data would contribute to better individual care, as in this way, all caregivers involved are aware of the patient's latest condition. Patients are often convinced that every healthcare provider is aware of their complete medical record (even between different healthcare institutions or during out-of-office care) and are surprised when this turns out not to be the case. For researchers and quality assessors, linking, sharing, and re-using of data would offer them a chance to gain clearer insights into care processes. For healthcare professionals, the linking, sharing, and re-using of health data would allow them to provide better care and probably saves a lot of frustration. Due to overinterpretation of privacy rules patients may encounter health care providers who do not have access to medical records others produced and are therefore not aware of a patients' medical history, which is not desirable.

An illustrative example demonstrating the benefits of reutilizing existing routine collected data in a smart manner, is the recently released atlas by the Netherlands Comprehensive Cancer Organisation (IKNL; Integraal Kankercentrum Nederland) that provides insight into incidence rates of certain tumours in certain areas in the Netherlands.²⁵ This is actually what we also had in mind with the sub-study described in Chapter 3, but then with a focus on the different neighbourhoods in the city of The Hague. In an ideal world we would redo the study described in Chapter 3 with a pseudonymized individual procedure that links the cancer registry data, to data of Statistics Netherlands and routinely collected

electronic medical record data from GPs. This would enable us to gain a more detailed insight of the determinants that influence attendance and non-attendance concerning the CSPs, currently lacking as we showed in Chapter 2. In ideal circumstances we would like to have information on the living environment of the screening-eligible people, and gain information on someone's profession, house value, family composition and financial situation. Furthermore, we would like to have insight in several medical characteristics, such as medical history, family history, medication, and substance use. In addition, would we be interested in the frequency of general practitioner (GP) visits, and maybe also recent health measurements (such as vital parameter, and for example body mass index as indicators of overall health). The challenge with all these variables is that the data, especially when combined, must not be traceable back to individuals.

For the future, non-commercial information systems should become available that allow free data linkage, sharing, and re-using (routine) data in primary care. A recent report by the ministry of Health, Welfare and Sports suggested that they are currently investigating how certain, more privacy sensitive data, can be (re)used for certain specified aims.²⁶

For the study described in **Chapter 4** our original plan was to proactively recruit screening-eligible individuals and conduct a face-to-face Q-methodological study in selected lower socioeconomic status (SES) neighbourhoods. However, due to the COVID-19 pandemic and the associated safety concerns, people were hesitant about leaving their homes, unable to replace this completely with adequate remote facilities, and the government advised minimizing contact with others and staying at home. Consequently, we had to find alternative approaches to reach and include participants. This ultimately did result in an online panel for recruitment, with pros and cons regarding the selection of panel members. By leveraging an existing research panel, we were able to include a considerable number of individuals. However, it is important to acknowledge that employing an online panel introduced a selection bias. As the study progressed, it became evident that our sample primarily consisted of individuals who held, on average, more positive views towards the CSPs and their participation. Therefore, we cannot deny the possibility that other perspectives would have emerged if we had been able to include screening-eligible individuals with different characteristics.

The studies presented in Chapters 5 and 6 can be considered exploratory in nature. To improve the robustness of our study findings, additional study inclusions would have been necessary. For **Chapter 5** this would mean more marginalised women should be included and screened. As described, we view this study as a 'proof of concept'. Municipal health services (GGD; Gemeentelijke Gezondheidsdienst) in The Hague, Rotterdam, and Amsterdam are currently exploring how they can utilize the findings from our study to

enhance the health of marginalized women in these cities. Regarding our findings in **Chapter 6** it would be interesting to see whether the results would differ if new or more interviews were conducted with GPs practicing in (more) rural regions of the Netherlands.

Implications for researchers, clinicians, and policymakers

The studies presented in this thesis can yield various implications for different stakeholders involved in the field of the Dutch cancer screening programmes (CSPs). In the following sections, I will delve into our findings, outlining their specific relevance for researchers, clinicians (GPs and other primary healthcare providers), and policy makers.

Implications for researchers

In the preceding chapters, comprehensive recommendations for further research have been provided based on the individual studies conducted. The main common denominator is that we showed that still more detailed information is needed on screening-eligible individuals residing in lower socioeconomic status (SES) neighbourhoods. People living in these lower SES-neighbourhoods happen to be at a higher risk of developing screening-specific tumours, wherefore potentially the greatest health benefits can be achieved in these subpopulations. Although our research showed interesting findings concerning differences, future researchers should look further into these issues. Appropriate methodologies suitable for people with lower SES are needed to make that possible. For this purpose collaboration with a knowledge institute like Pharos is highly recommendable.²⁷ Building upon the findings in Chapter 5 and existing international literature, it is strongly advocated to make use of proactive, face-to-face strategies to engage with individuals in low(er) SES-neighbourhoods.^{28, 29}

A related recommendation would be that future researchers take factors as ‘(low) literacy’ and ‘health illiteracy’ into account. As we highlighted in Chapter 2 these factors seem to be of high importance when it comes to screening attendance. Here it is worth mentioning that currently in the Netherlands, 2.5 million individuals (aged ≥ 16 years) have low literacy skills, and one in four (25%) Dutch people possess limited health skills.³⁰ Both low literacy as health illiteracy are known to be more prevalent among those with lower educational attainment, elderly, and migrants.^{31, 32} In addition are these issues known to have a burden on health outcomes, among others also on the incidence of cancer.³³ Knowing this, the new changes to the cervical CSP (for instance sending self-tests) might be less appropriate for people who have low literacy levels, possess low health literacy skills. It is precisely among these groups that you hope to optimize the attendance rates but might not benefit at all from the innovations in the CSP. Subsequent and related are also cultural factors, as a recent study among Moroccan-Dutch women clearly showed.

Included women were asked about their attitude regarding the cervical CSP, and it turned out that they became more positive regarding the screening programme after seeing a culturally sensitive educational video to facilitate informed cervical cancer screening decisions.³⁴

Furthermore, future researchers should look into some relatively small modifications, such as altering the envelope, or the invitation letter by including a text stating, such as: “The message is positively endorsed by your GP”. Subtle adjustments like these might already have large positive impact on the attendance rates, without having to invest too much effort, and should therefore be considered in future studies. Finally, as a last suggestion and thus far unexplored in our studies, integrating all three CSPs together may have unknown benefits. It might be profitable and convenient for women to receive an invitation for all three CSPs simultaneously. Combining the three CSPs might contribute to providing women with comprehensive information and facilitating their participation in screenings to the fullest extent possible.

Implications for clinicians: GPs and (other) primary healthcare providers

As a positive note to be mentioned, is that our findings highlight the enduring high appreciation and trust that the public places in primary care and in GPs. In these post-COVID-19 pandemic times this is in contrast with another notion, that public trust in (medical) science seems to be declining.

Two important points for medical professionals ‘in the field’. First, clinicians are able to influence the attendance rates of the CSPs. Second, GPs are in the position and capable of ensuring that individuals with higher risks do participate in the CSPs; this follows both from our sub-studies, but is also earlier described in several publications.³⁵⁻³⁷ Clinicians therefore should realize that it matters how they speak, feel and decide upon the CSPs. They can really make a difference concerning cancer screening participation. Thereby, engagement in a CSP is not a purely rational matter. It is shaped by practical, emotional, cultural, and religious factors.³⁸ This further emphasises the significance of fostering and enlarging the role of primary healthcare providers within the CSPs.

For multiple studies, especially the one described in Chapter 3, we tried to make use of routine care – and registry data that are already present in the electronic health records (EHRs) of general practices. However, during our studies we encountered a common problem, which is that medical data are somewhat poorly coded and underused in current EHRs. As reuse of EHR-data will probably become more important in the nearby future, to reduce patient selection in research and for population health management purposes, greater emphasis should be placed on the value of correct coding of medical information

during the medical training and EHR systems should be further improved in supporting the coding facilities during routine care. An earlier study examining the quality of cancer registration in primary care, based on International Classification of Primary Care (ICPC) codes,³⁹ revealed that approximately 40% of cancer cases cannot immediately be recognized in the coded registrations, and almost half of the cases is coded prematurely and based on hypothesis, resulting in false positive cancer diagnoses.^{40,41} In that respect, there is still much to be gained in terms of proper coding, while also inadequate coding support that the EHRs still present to the users, should be reduced.

A last recommendation for GPs and primary healthcare providers has to do with the advice they are providing screening-eligible people who have questions about the CSPs. What we have noticed is that many people, and the majority of healthcare providers we have spoken to, hold rather positive views on the CSPs.^{9,42,43} However, screening can also have certain harmful effects. Since clinicians are primarily concerned with the health of their patients, a good understanding of the pros and cons of the CSP is essential and physicians should be able to provide patients with complete and accurate information. In daily practice most significant negative effects of the CSPs are the amounts of overdiagnosis and overtreatment.^{44,45}

Implications for policymakers

For policymakers, import recommendations align with the recommendations for researchers. The need to allocate more efforts towards individuals residing in socioeconomically deprived neighbourhoods is imminent. These individuals often face various health-related challenges and preventive research participation is not typically a priority for them. Additionally, they may lack awareness of existing preventive programmes, as for the CSPs.^{12,46-49} It is essential, both for the well-being of individuals and the society as a whole, that screening-eligible individuals in lower SES-neighbourhoods actively participate in these programmes, also when taking the associated disease-related health costs into account.^{50,51} The findings presented in Chapter 5 highlight the importance of exploring new invitation approaches to engage marginalized women in the CSPs.

Then, concerning the policymakers of the Dutch College of General Practitioners (NHG; Nederlands Huisartsen Genootschap) a more definite stance when it comes to advising patients on their participation in the CSPs would be welcome. Despite years of thinking, reading, and researching the CSPs, it remains challenging to provide clear information and subsequent guidance on cancer screening participation. While the politically correct approach would be to leave the full decision with the individual, in reality this is not a fair option. Despite we are in the middle of the zeitgeist of shared decision making,

it is also known that this concept is not always ideal, nor is it feasible for everyone.⁵² In the current guidelines it is stated that GPs should be supportive towards the CSPs. Unfortunate, even well-intentioned GPs, may still find it difficult to offer accurate and honest information to screening-eligible individuals regarding the CSPs.⁵³ Just, given the complexity and sensitivity of the topic, NHG should adopt a clearer position on screening participation, and should provide GPs with appropriate information which is open and honest. In return this will empower GPs to deliver more nuanced education to screening-eligible individuals about the CSPs, and in the long run will thus optimize cancer care.

Lastly, derived from our research two unexplored ideas might inspire future policymakers. First, the possibility of implementing an 'opt-out' system for sharing screening attendance data of individuals with the GP-practices might help to target primary care interventions. This approach would ensure that GP-practices receive essential CSP information by default unless patients actively choose to opt out. By knowing the attendance screening status of their patients, GPs and other primary healthcare providers are better fit to aid their patients. Second, discussing our research abroad, colleagues wondered why in the Netherlands we do not have a dedicated primary healthcare provider, physician or nurse, specifically trained to address women's primary care needs. This concept, similar to the 'frauenarzt' model in Germany, might create a space where female patients can have confidential discussions about women's health, including the CSPs and screening participation.⁵⁴ This might be especially effective to reach women with an immigrant background. Implementing such a role might provide an ideal setting for addressing women's health concerns and promoting participation in the screening programmes.

Future perspectives

The studies presented in this thesis can – and hopefully will – be used to think about the future of the population-based cancer screening programmes (CSPs) in the Netherlands. In the next section three questions are addressed to discuss on how, if and when the current CSPs of the Netherlands could be enhanced.

What do we expect from primary care?

As is widely known and underlined by the studies in this thesis, a strong primary care is crucial for the healthcare system in the Netherlands. General practitioners (GPs) and other primary healthcare providers have become increasingly busy lately, especially since the range of tasks kept expanding and the demand on healthcare services increased. As a result anno 2023 many GPs complain of a high workload, and GPs are at risk of (prematurely) quitting their jobs.⁵⁵ There should be a public debate about what 'we' (read as: the society) expect from primary care and our GPs. Such a debate should

include a discussion on the specific health tasks and roles GPs and GP-practices should have. Thereby it should be discussed what kind of role we see for GPs with respect to prevention programmes, such as the CSPs.

As this thesis shows, GPs are in the position as well as both capable and willing to play a substantial part in the CSPs, and it appears that some patients, or at least a certain group of patients, also prefer greater involvement of GPs. In previous literature it was described that screening-eligible people appreciate contact with their GP when it comes to participating in cancer screening.⁵⁶ If 'we' consider cancer screening participation to be of significant importance, then 'we' should ensure that GPs and GP-practices are able to empower the CSPs. Recent studies stated that GPs are interested in taking a more active role in preventative healthcare, yet the broader appeal for greater emphasis on prevention is not being adequately addressed.^{57,58} What might help is that GPs themselves speak up and declare even more prominently what they are able and willing to do, and what not.⁵⁹ Given our studies, our understanding from daily practice and international literature, we strongly believe that primary healthcare providers can play a key role in the optimisation of the current CSPs.

Thereby I hope that the concept of 'trust' in the healthcare system and healthcare professionals returns, which might also contribute to a reduction and emphasis on filling out all paperwork, the so called famous 'Paarse Krokodil' (Purple Crocodile).⁶⁰

What do general practitioners want?

Over the past few years we have spoken to many GPs and asked GPs what they need in order to empower the CSPs in the future, they roughly responded with three answers: I) more GPs are needed, II) GP-practices should become smaller, i.e. fewer patients per GP, and III) better/more funding is needed for the entire (primary care) healthcare system.

It can be said that the government has been working on increasing the number of GPs for years. Nevertheless, it still does not seem easy to educate more GPs, especially in the more peripheral areas of the Netherlands. The workload remains high, and additionally there is an issue of a significant shortage of support staff for GPs continues to persist.^{61, 62} Therefore, a significant challenge emerges for various stakeholders in primary care, as well as for society at large.

The National General Practitioners Association (LHV; Landelijke Huisartsen Vereniging) has been arguing for a long time for smaller number of registered patients per GP-practice and stated that a norm practice should consist of about 1800 patients.⁶³ Although the practice size per GP has indeed decreased in recent years – from 2350 patients in 2006, to

2095 patients in 2023 – we are still far from 1800 patients enlisted per GP (fte).⁶⁴ Recently, the LHV has signed the Integral Care Agreement (IZA; Integraal zorgakkoord),⁶⁵ in which there are certain positive notes that might benefit both GPs and patients concerning the CSPs. The most concrete example here is that GPs get more time per patient (Meer Tijd Voor de Patient). Extended consultations seem essential in order to inform and guide patients adequately also with respect to the CSPs.

Regarding the last point, it is a bit difficult to be optimistic. Healthcare costs have been rising for decades, and so far no unequivocal solution seems to have been found to solve this problem.⁶⁶ It might be useful to think about paying for health and keeping the population healthy, and thus focusing more and more on prevention. Which leads us to the next question.

What about prevention?

In addition to the public debate on the role of the GP, the role of (primary) prevention is an issue for GPs. When it comes to cancer, there is a lot more that could and should be done to prevent cancer (see also the introduction of this thesis). Most logical steps would be to create more public awareness about cancer risk factors and promoting healthy lifestyle choices. When looking at the numbers, currently only about 1.8% of the total of healthcare costs are spent on population-wide preventive and public healthcare.⁶⁷ We are willing to spend a significant amount of money on extremely expensive medications and treatments, but there is scarce funding available for the prevention of common diseases. Fortunately, the public opinion regarding this seems to be changing.⁶⁸⁻⁷⁰ Where the Netherlands rated in the top three healthiest countries of the world, only a few decades ago. 'We' have now dropped to the 30th place.⁷¹ This is the next challenge for politics. Since 2018 there has been a prevention agreement, hopefully this will contribute to a healthier Dutch population in the long run.⁷²

Cancer screening based upon Population Health Management principles

Anno 2023, one might wonder if the current population-based cancer screening programmes (CSPs) are still best suited to reduce the burden of the screening-specific tumours for the population as a whole. As stated in the introduction, the WHO declared (based on the Wilson and Jungner criteria) that the benefits of participating in a screening programme should outweigh the potential disadvantages of the screening programme.⁷³ In the current situation there however appears to be a prevailing inclination wherein the advantages at the population level appear to surpass the potential drawbacks at the individual level. Given the findings of our studies presented in this thesis we believe it is

about time to think on how the current CSPs can be optimized in such a way that both efficiency and effectiveness of programmes are increased, whereby individual harms ideally get further diminished. Introducing Population Health Management principles into cancer screening might help to achieve this goal.

Defining Population Health Management

Population Health Management (PHM) can be defined as a healthcare strategy that shifts its attention from individual patients to specific at-risk population groups in order to address the current challenges within the healthcare system.^{74, 75} Given the mounting difficulties in Western countries to deliver cost-effective, accessible, and high-quality healthcare, it appears that adopting this approach is becoming increasingly essential.^{76, 77} While current literature contains multiple definitions on PHM, we would like following the master programme in The Hague, by defining PHM as: “*A proactive management of a population at risk for adverse health outcomes; through a variety of individual, organizational and cultural interventions to improve patient, clinical and financial outcomes, based on risk stratified needs assessment of the population; supported by a comprehensive governance infrastructure*”.⁷⁸ In order to pursuit PHM, the aims of the Quadruple Aim are often mentioned. These are: (I) to improve population health, (II) to provide better quality of care, (III) to ensure that healthcare provider experiences improve, and (IV) to reduce the (overall) healthcare costs.⁷⁹

In order to understand the above-mentioned definition, the concept of ‘risk stratification’ might need some clarification. It refers to a methodical evaluation of a patients’ profile, in order to assign an individual risk score. This established risk profile can then serve as the basis for delivering tailored healthcare to both the individual and the larger population based on their respective risk levels.

Population Health Management building blocks in this thesis

Although individual studies have already been briefly summarized at the start of this chapter, it might help to now rethink about these findings within the definition of PHM in mind. It then becomes clear that the studies within the thesis can also be regarded as PHM building block for CSPs in the Netherlands.

In Chapter 2, several characteristics are described that could be used for risk stratification. Chapter 3 highlights the importance of involving individuals residing in low socioeconomic status (SES) neighbourhoods in screening examinations. Here specific tailor-made interventions are most likely needed in order to engage these people within the CSPs. In Chapter 4, we demonstrate the desire among potential participants to receive further support and guidance from primary healthcare providers. Subsequently,

Chapter 5 explores potential strategies for addressing unique barriers faced by a small, in particular, high-risk subgroup in participating in a CSPs. Lastly, Chapter 6 reveals that primary healthcare providers (GPs) themselves are inclined to be (more) involved in the current CSPs, hence potentially serving as key enablers for incorporating PHM principles within the screening programmes.

As the studies within this thesis show, we believe that the current CSPs could benefit from making use of PHM principles, in which primary healthcare providers are given a more prominent and proactive role. As the studies in the thesis are all conducted in highly urbanised regions of the Netherlands, it would make sense to see if a pilot-study can be set-up within this region. Effective integration of PHM principles should be done in close collaboration with the national screening organization, primary healthcare provider organizations, and ideally with some level of political support.

For risk stratification I envision a prediction tool, based on characteristic out of the Electronic Health Records (EHR) that provide insight into the degree of risk an individual faces concerning one of the screening specific tumours, similar to the frailty index score for the elderly.⁸⁰

Conclusion

This thesis provides additional evidence that the current population-based cancer screening programmes (CSPs) of the Netherlands could be further optimized, in particular regarding the screening uptake of people living in highly urbanized and/or low(er) socioeconomic status (SES) neighbourhoods. Our findings suggest that non-attendance in these lower SES-neighbourhoods is associated with more unfavourable, relatively late-stage, tumour diagnosis. Given that participation in cancer screening is not solely based on rational decision-making, primary healthcare providers could play an important role in educating and advising individuals who are eligible for participation in the CSPs. We found that both screen-eligible people and general practitioners (GPs), support the idea of a more targeted GP-involvement in the CSPs. Based on the findings of this thesis, we recommend that a proactive primary care approach would be suitable to enhance the current cancer screening uptake, with the ultimate goal to screen (sub) populations who are highest at risk of developing the screening-specific tumours.

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