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MD, Specialist in Public Health

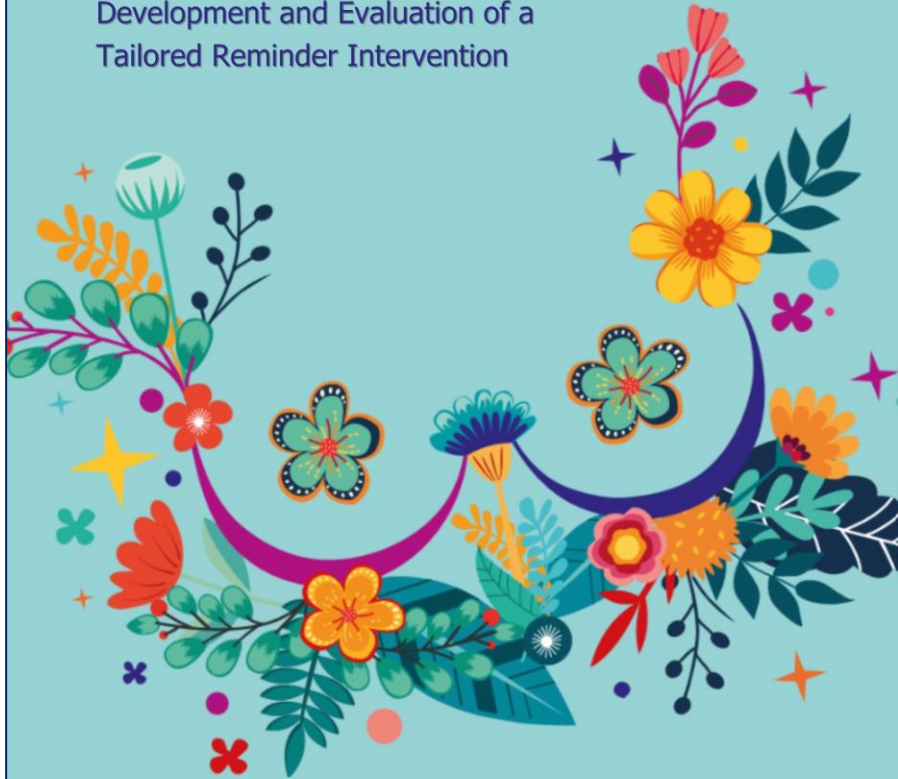
Doctoral Researcher, Research Group
Social Epidemiology and Health Policy (SEHPO)

- **Social determinants of health and healthcare utilization;**
- **Improving healthcare access for underserved and vulnerable populations.**



Tackling Socioeconomic Inequities in Breast Cancer Screening Participation

Development and Evaluation of a Tailored Reminder Intervention



Allegra Ferrari



***Tailored reminder strategies
for underserved populations:
evidence from a randomized trial
in breast cancer screening***



Interventions That Increase Use of Adult Immunization and Cancer Screening Services: A Meta-Analysis

Erin G. Stone, MD; Sally C. Morton, PhD; Marlies E. Hulscher, PhD; Marg Jeremy M. Grimshaw, MD, PhD; Brian S. Mittman, PhD; Lisa V. Rubenstein and Paul G. Shekelle, MD, PhD

Annals of internal medicine, 136(9), 641–651.

<https://doi.org/10.7326/0003-4819-136-9-200205070-00006>

Table 1. Intervention Components by Service

Intervention Component	Studies according to Target				Studies*
	Patients	Provider	Organization	Community	
	←-----n-----→				
Education					
Influenza Immunization	17	7	6	1	20
Pneumonia Immunization	5	6	4	–	8
Mammography	26	15	13	–	31
Cervical cytology	14	10	7	–	17
Colon cancer screening	19	11	5	–	23
Provider feedback					
Influenza Immunization	2	2	–	–	2
Mammography	3	4	2	–	4
Cervical cytology	1	3	1	–	3
Colon cancer screening	1	4	1	–	4
Financial incentive					
Influenza Immunization	7	3	1	1	7
Pneumonia Immunization	1	1	1	–	1
Mammography	2	1	2	–	2
Cervical cytology	3	1	1	–	3
Colon cancer screening	5	1	1	–	5
Reminders					
Influenza Immunization	19	12	2	1	24
Pneumonia Immunization	4	10	1	–	10
Mammography	29	21	11	–	37
Cervical cytology	16	17	6	–	23
Colon cancer screening	21	15	5	–	28
Organizational change					
Influenza Immunization	5	3	6	–	6
Pneumonia Immunization	4	2	4	–	4
Mammography	12	8	14	–	14
Cervical cytology	8	5	9	–	9
Colon cancer screening	5	5	7	–	7
Mass media					
Influenza Immunization	1	1	–	1	1

Epidemiology |  Full Access

Association between human papillomavirus vaccine uptake and cervical cancer screening in the Netherlands: Implications for future impact on prevention

[Anneke Steens](#), [Cornelia C.H. Wielders](#), [Johannes A. Bogaards](#), [Hendriek C. Boshuizen](#),
[Sabine C. de Greeff](#), [Hester E. de Melker](#) 

First published: 12 June 2012 | <https://doi.org/10.1002/ijc.27671>


Public health
Research

Association between mothers' screening uptake and daughters' HPV vaccination: a quasi-experimental study on the effect of an active invitation campaign

 [Francesco Venturelli](#)^{1, 2, 3}, [Flavia Baldacchini](#)⁴, [Cinzia Campari](#)^{2, 5}, [Cinzia Perilli](#)⁶, [Maria Grazia Pascucci](#)⁷, [Alba Carola Finarelli](#)⁷, [Luigi Moscara](#)⁸, [Paolo Giorgi Rossi](#)^{1, 2}

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Association of human papillomavirus vaccination with cervical cancer screening: A systematic review and meta-analysis

[Ssentongo, Paddy MD, PhD, MPH^{a,b}](#); [McCall-Hosenfeld, Jennifer S. MD, MSc^{a,c}](#); [Calo, William A. PhD, JD, MPH^a](#); [Moss, Jennifer PhD^d](#); [Lengerich, Eugene J. VMD, MS^a](#); [Chinchilli, Vernon M. PhD^a](#);  [Ba, Djibril M. PhD, MPH^{a,*}](#)

[Author Information](#) 

Medicine 101(28):p e29329, July 15, 2022. | DOI: 10.1097/MD.00000000000029329 


Contents lists available at ScienceDirect



ELSEVIER

Vaccine

journal homepage: www.elsevier.com/locate/vaccine



Like mother, like daughter? Mother's history of cervical cancer screening and daughter's Human Papillomavirus vaccine uptake in Flanders (Belgium)

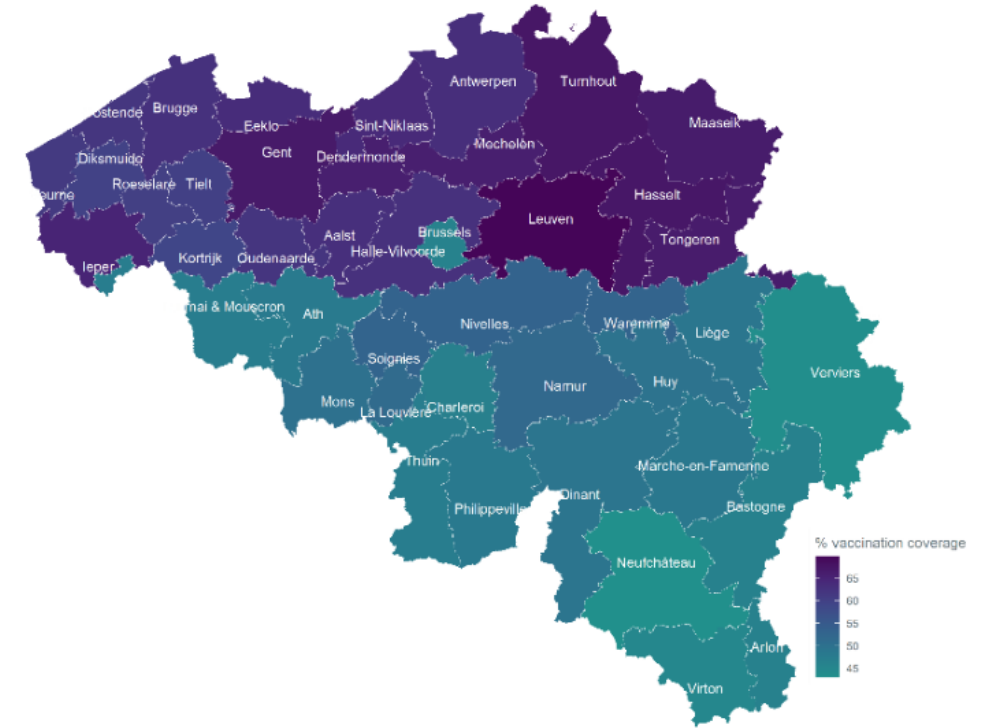
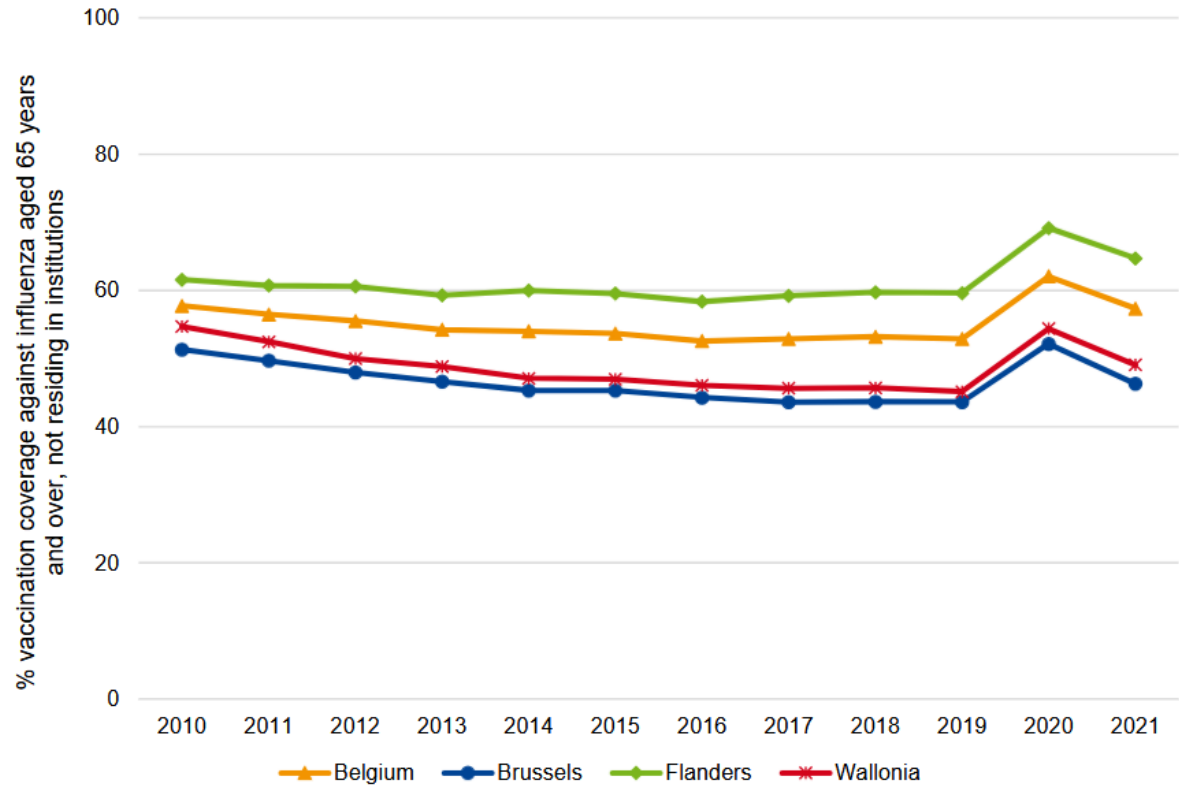
Eva Lefevere^{a,b,*,1}, Niel Hens^{c,d,e,f}, Heidi Theeten^{d,e,2}, Karel Van den Bosch^{a,3}, Philippe Beutels^{d,f,4}, Frank De Smet^{g,h,5}, Pierre Van Damme^{d,e,6}

<https://doi.org/10.1016/j.vaccine.2011.08.039>

Odds of HPV vaccination initiation more than 4 times higher for girls whose mother had one Pap test than for girls whose mother had none (OR = 4.5; 95% CI = 3.5–5.9)

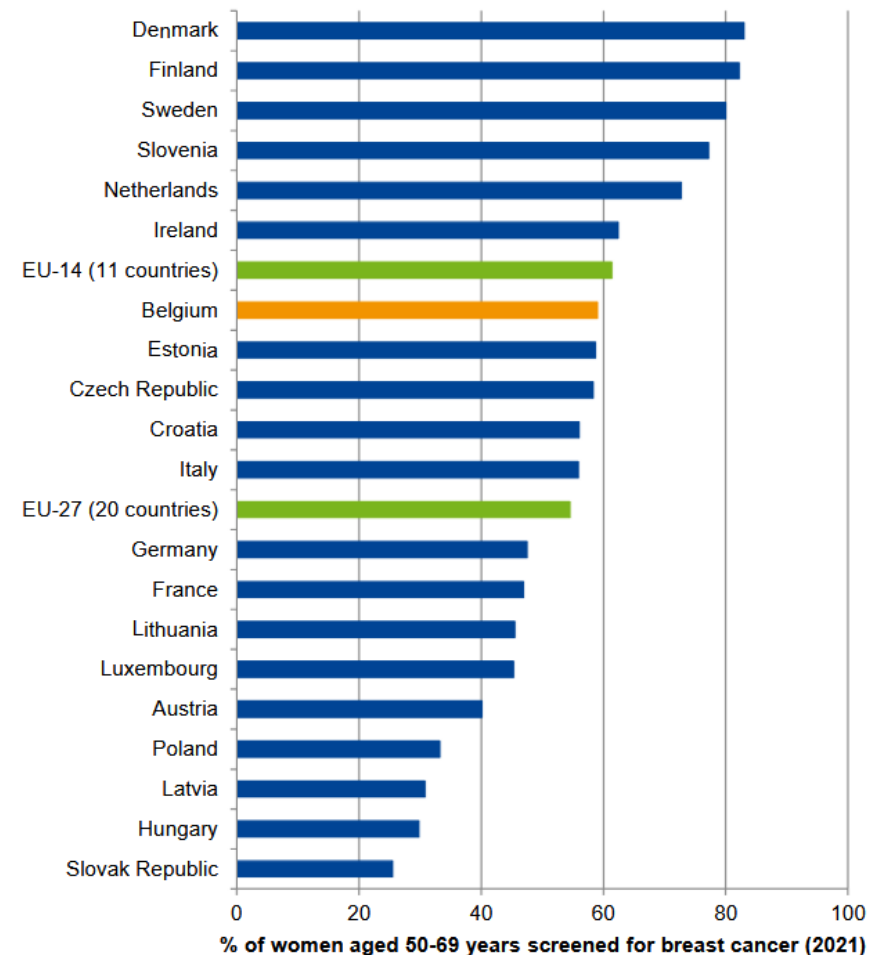
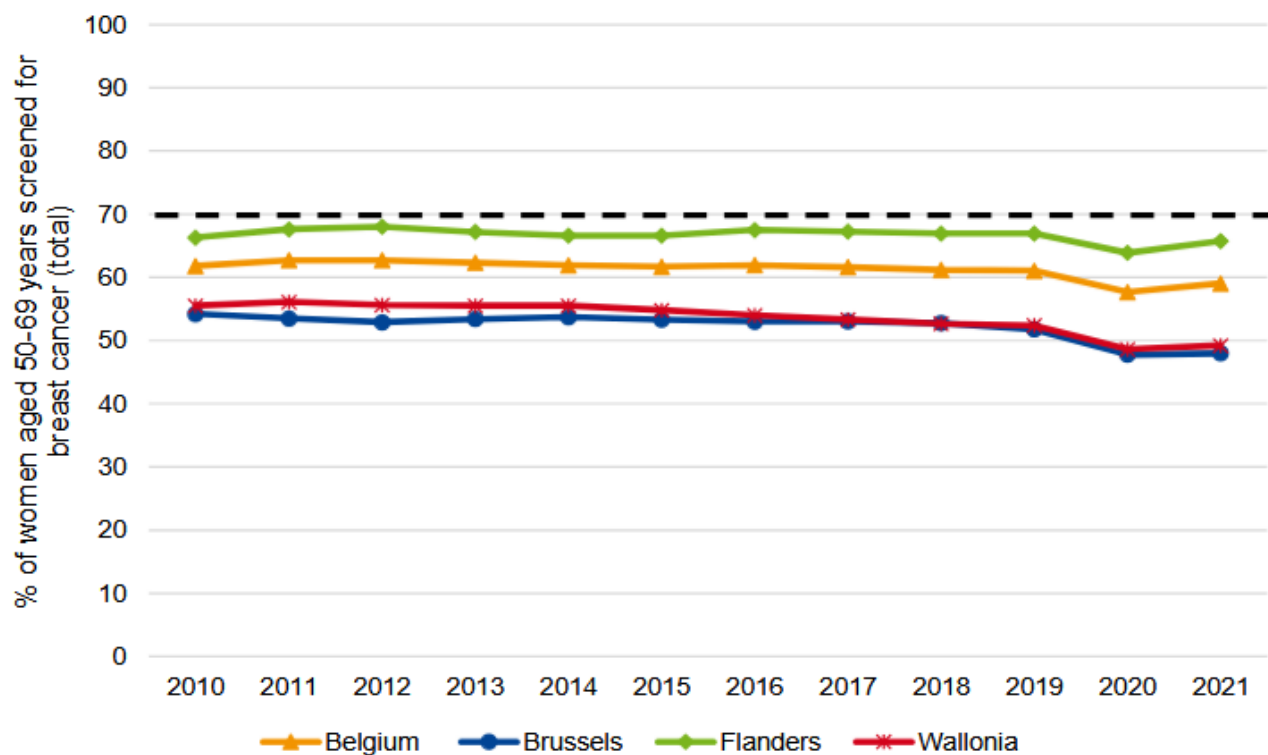
Largest effect among girls living in neighborhoods with the lowest median income (OR = 6.0; 95% CI = 3.6–10.1)

Figure 1 – Coverage of vaccination against influenza in people aged 65 years and over, by region (2010-2021) and by district (2021)



Lower influenza vaccination rate among people entitled to increased reimbursements for healthcare costs - proxy indicator for low-SES (55.2% vs. 58.1%).

Total coverage breast cancer screening in women 50-69 years old in 2010-2021: (a) by region, (b) international comparison



Source: OECD health data 2023

Lower breast cancer screening coverage among people entitled to increased reimbursements for healthcare costs - proxy indicator for low-SES (43.1% vs. 62.9%)

- High BC incidence rates
- Established population-based screening program since 2001 (BC-specific mortality reduction up to 51%)



Age-standardised BC incidence rate of **188 per 100,000** females

You decide.

You decide whether to have a screening mammogram. It is therefore important to be aware of the benefits and drawbacks of the examination. This way, you can make a conscious choice, if necessary together with your doctor.

Benefits

- Breast cancer can be detected early, before you notice it yourself.
- You are more likely to be able to recover from it.
- The risk of dying from breast cancer is reduced.
- The examination is free of charge and of high quality.
- Several doctors view your images. This reduces their chances of not detecting the breast cancer.

Drawbacks

- Some cancers do not exist at the time of the examination, are too small to see or are overlooked.
- Some breast cancers grow so slowly that they would never cause the patient to suffer, but they are treated anyway.
- Radiation can also cause cancer, but that risk is very low in this examination.

Be sure to seek advice from your doctor:

- if you notice a change in a breast: lump, skin discolouration, dimpling, nipple retraction, rash around the nipple, inflammation or loss of fluid or blood from the nipple;
- if you have a greatly increased risk of breast cancer: several women in your immediate family (grandmother, mother, sisters or daughters) have had breast cancer.

Do you have any questions?

Further information can be found:

- by consulting your GP or gynaecologist
- by visiting www.borstkanker.bevolkingsonderzoek.be
- by calling the toll-free number 0800 60 160
- by e-mailing info@bevolkingsonderzoek.be
- via this QR code:

You decide for yourself whether or not to participate in the screening programme. Inform yourself well.

Logos: BEVOLKINGS ONDERZOEK BE, CwKO CENTRUM VOOR KANKEROPSPORING ANTWERPEN BRUSSEL GENT LIÈGE, Viaanderen a.smg

Free breast cancer screening.

WE DO. AND WHAT DO YOU DO?

TIMELY DETECTION IS IMPORTANT.

Information on the Breast Cancer Screening Programme for women aged 50 to 69.

BEVOLKINGS ONDERZOEK BORSTKANKER

- Participation is still suboptimal (approximately 50%) and **15% lower** in municipalities with average income below the poverty line.

Advancing Mammographic Screening Among Underserved Groups: A Systematic Review and Meta-Analysis of Intervention Strategies to Increase Breast Cancer Screening Uptake

Allegra Ferrari^{1,2*}, Deborah Jael Herrera¹, Wessel Van De Veerdonk^{1,3}, Wendy D'haenens³, Andrea Ruiz Alejos¹, Nigus Billilign Yimer¹, Sheila Orwa¹, Liesbet Van Bos³, Sarah Talboom⁴, Lilu Ding^{1,5}, Mathieu Goossens⁶ and Guido Van Hal^{1,6}

- 44 studies,
- 161,141 individuals
of which 14,720 from underserved groups



Reminders are an effective strategy among underserved populations (OR 3.39)

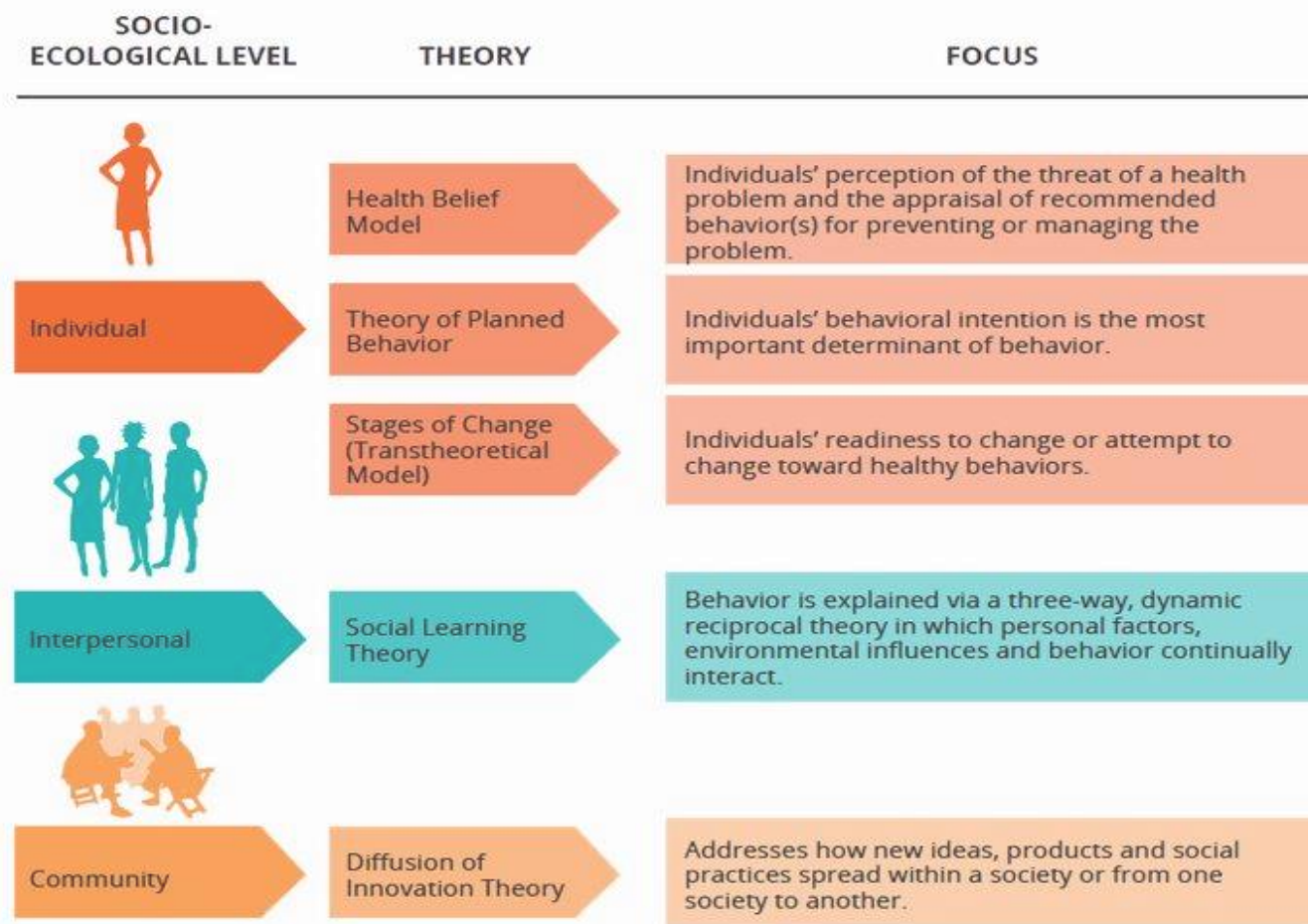
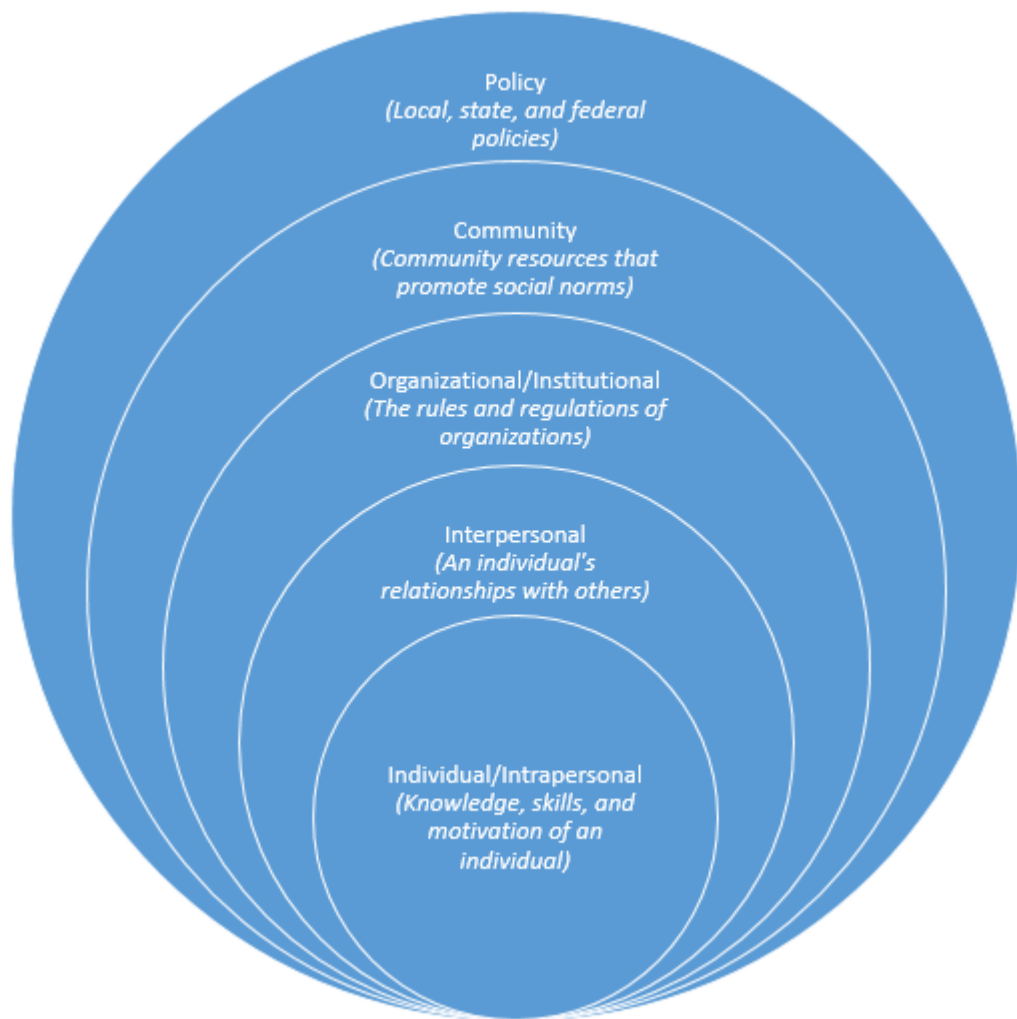
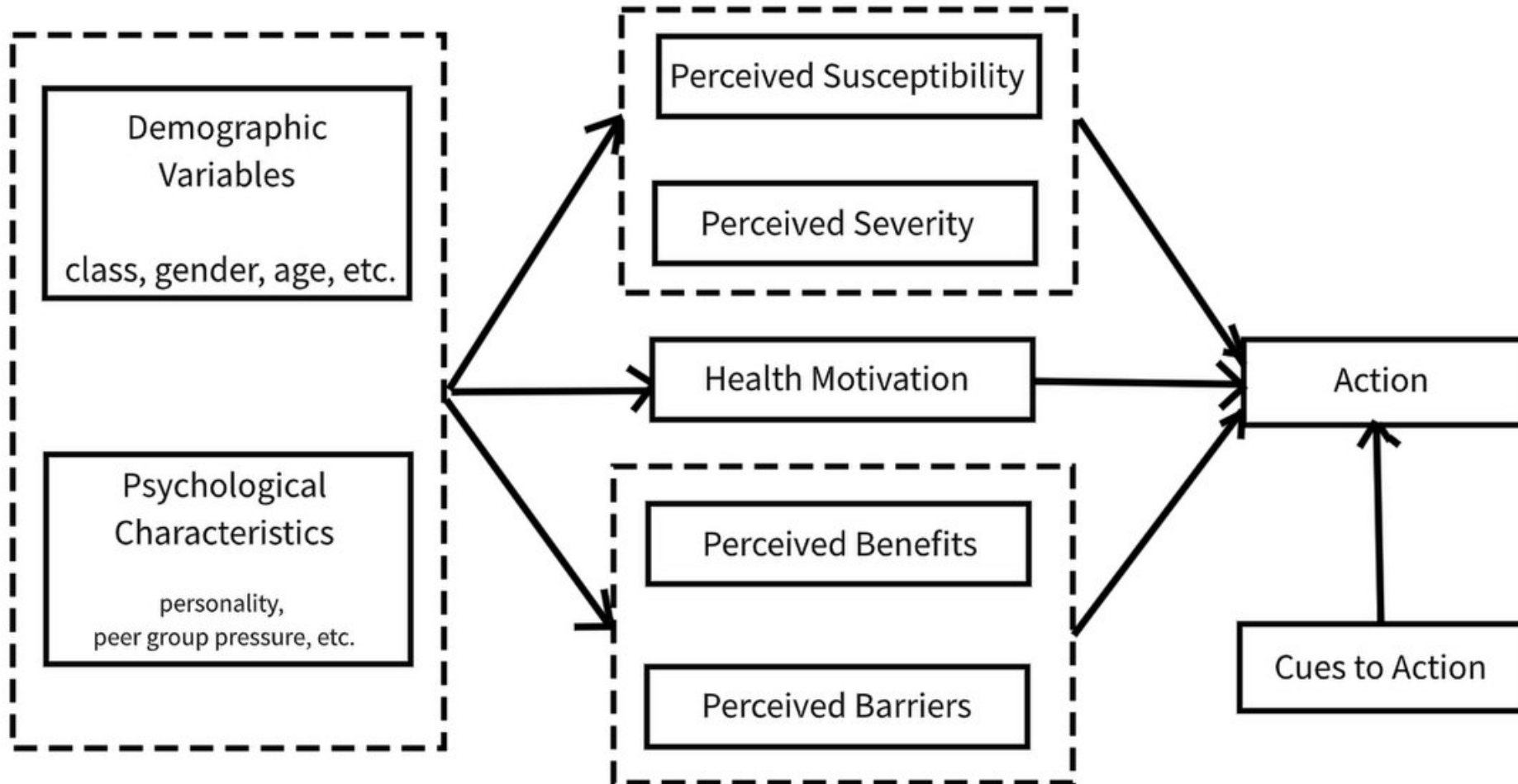


Diagram of the social-ecological model. Image attribution: By Philroc [CC BY-SA 4.0], from Wikimedia Commons
 Social and Behavior Change Communication Theory. Image attribution: SBCC Implementation Kits.

The Health Belief Model



❑ **Focus group discussions**, with low-SES females aged 50-69

1. 24/4/2023, Open learning center, Linkeroever Antwerp
2. 13/6/2023, Open learning center, Luchtbal Antwerp
3. 1/6/2023, Walk-in center, Mechelen

19 participants:

- 3 Flemish
- 16 with immigrant background

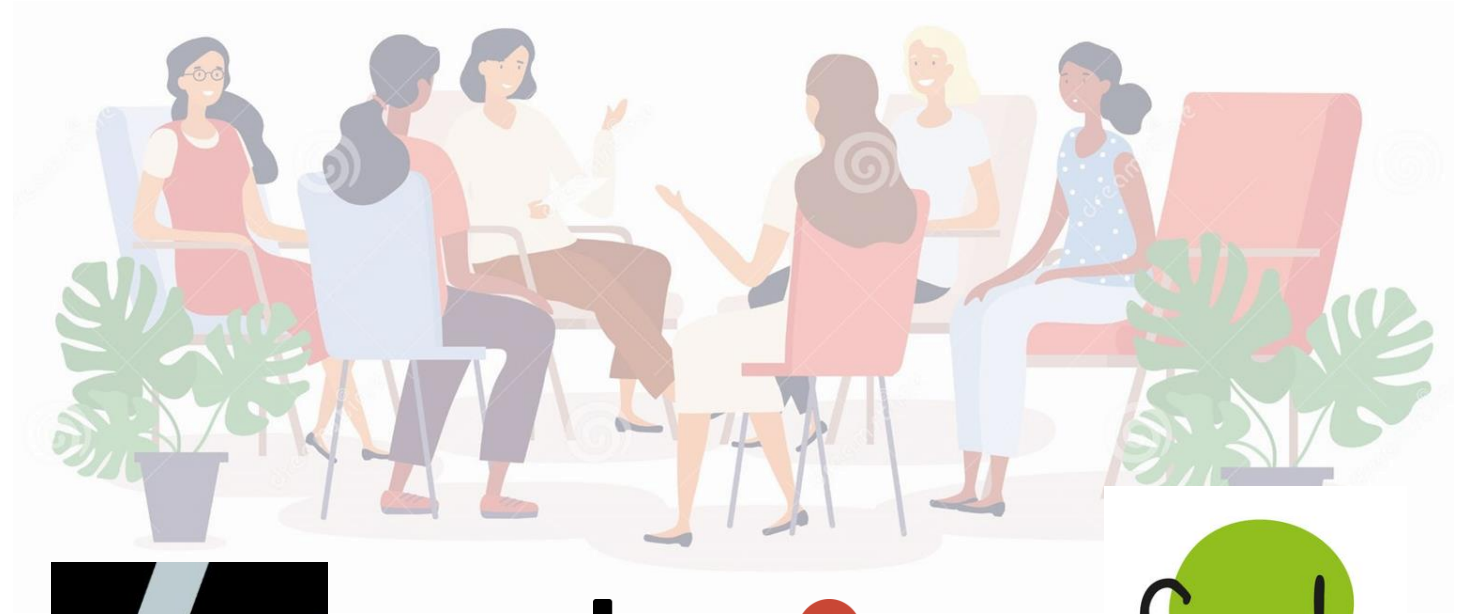
❑ **Final co-creation session**

23/10/2023, Oostende

Organized by UA and Thomas More in collaboration with Saamo (Together Tackling Exclusion) and FMDO (Federation for Global and Democratic Organizations) during the weekly meeting "**women's talk**".

14 participants:

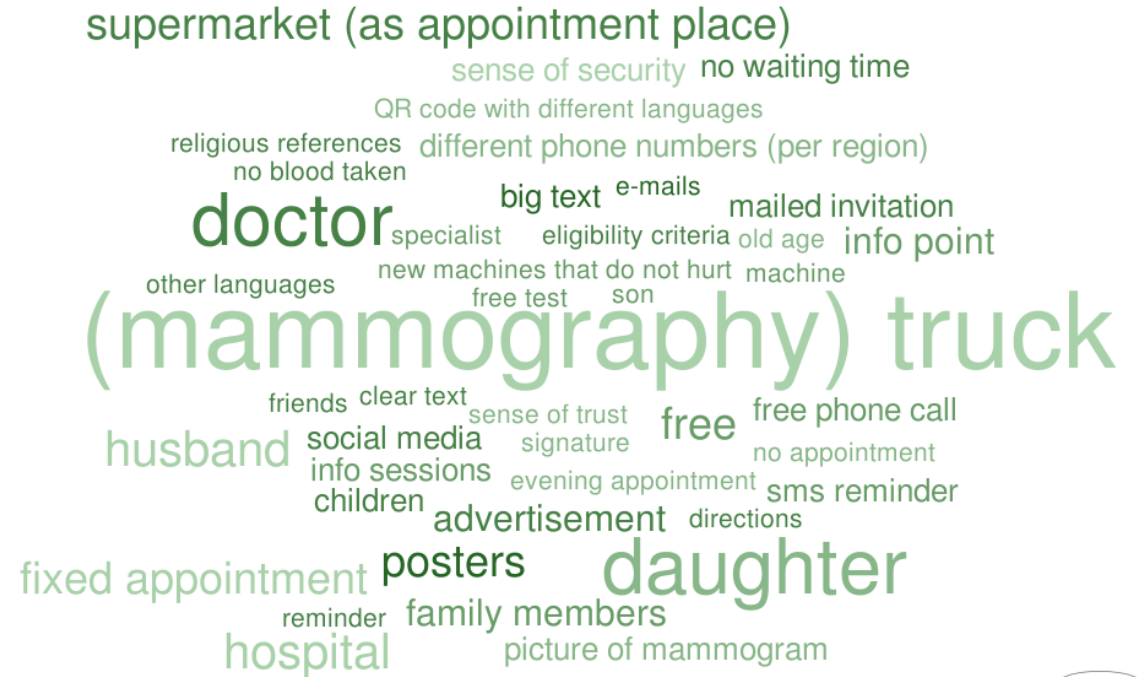
- 1 Flemish,
- 13 with immigrant background



Barriers



Facilitators



Standard invitation letter

BEVOLKINGS ONDERZOEK BORSTKANKER

Vlaanderen in zorg

Your personal code:

Screenings mammografie

WE DO. AND WHAT DO YOU DO?

To

Dear

Every two years, you can be screened for breast cancer free of charge. This allows us to detect any breast cancer before you notice it yourself. You decide for yourself whether to take part.

Every year, more than 200,000 women in Flanders take part in the screening. Are you in? We have already set up an appointment for you.

HOW DO YOU PARTICIPATE?

Go to the appointment we propose here.

Date and time:
Mammography unit:

Bring the following with you:

- your identity card;
- this letter.

Do you want to reschedule the appointment or do you not want to accept this invitation?

- Call 0800 60 160 free of charge
- Visit www.borstkankeronderzoek.be
- E-mail info@bevolkingsonderzoek.be

The examination is FREE OF CHARGE if you are registered with a Belgian insurance fund.

Do you want to know how the screening works? Read about this in the enclosed leaflet.

If you have any personal questions or doubts about participating,

- discuss these with your GP.
- Visit www.bevolkingsonderzoek.be

Kind regards,

Dr Patrick Martens
Director, Centre for Cancer Detection (CvKO)

BEVOLKINGS ONDERZOEK.BE | VZW CENTRUM VOOR KANKEROPSPORING | ADMINISTRatieve ZETEL: RUDERSHOVE 4, 8000 BRUSSEL | WWW.BEVLKINGSONDERZOEK.BE | INFO@BEVLKINGSONDERZOEK.BE | CvKO CENTRUM VOOR KANKEROPSPORING

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Expressions difficult to understand

"Are you in? we have already set up an appointment for you"

to take part prevention
call armpit
mammography

"This allows us to detect any breast cancer before you notice it yourself"

"We do it. and what do you do?"

mutuality lump to join
mammobile to participate
screening phone code breast cancer
breast cancer research
"You decide for yourself whether to take part"


WordArt

Expressions easy to understand

machine look at (the chest)
supermarket (as appointment place)
(mammography) truck scanner
hospital control sick doctor mutuality
phone test good free biopsy visit not good
watch (the chest) post to pay problem
appointment feel (the chest)
mobile zip code medical card to decide check
cancer letter information to talk every 2 years
date to choose prevention
breast cancer mammography
research (mammography) car
something hard (in the chest)
women

Word

Standard invitation letter

BEVOLKINGS ONDERZOEK BORSTKANKER  **Vlaanderen** is zorg

Your personal code:

Screenings mammografie

WE DO. AND WHAT DO YOU DO?

To

Dear

Every two years, you can be screened for breast cancer free of charge. This allows us to detect any breast cancer before you notice it yourself. You decide for yourself whether to take part.

Every year, more than 200,000 women in Flanders take part in the screening. Are you in? We have already set up an appointment for you.

HOW DO YOU PARTICIPATE?

Go to the appointment we propose here. Date and time: Mammography unit:	Bring the following with you: <ul style="list-style-type: none">• your identity card;• this letter.
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Do you want to reschedule the appointment or do you not want to accept this invitation?

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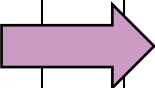
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Director, Centre for Cancer Detection (CvKO)

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GET CHECKED FOR BREAST CANCER FREE OF CHARGE

THIS LETTER IS IMPORTANT!

Your personal code:

To


Don't speak Dutch? Download this letter in another language.
Deutsch, English, Español, Française, Italiano, Русский, Română, Shqipja, Türkçe, العربية, فارسی, 中文.



SCAN THE QR CODE

Dear

You can get checked for breast cancer free of charge. This is important for your health. Would you like to be checked? Come to your appointment.

Your appointment	What do you bring?
Date and time:	 <ul style="list-style-type: none">• Your ID card• This letter
Address:	

The check-up is FREE from the age of 50 if you are a member of a Belgian health insurance company

Would you like to make a new appointment?


- E-mail : info@bevolkingsonderzoek.be
- Call toll-free: 0800 60 160 (Monday-Thursday 8-12am and 1-5pm, Friday 8-12am and 1-4pm)


Do you have questions about the check-up?

- Discuss them with your family doctor.
- Visit: www.borstkanker.bevolkingsonderzoek.be

Kind regards,

Dr. Patrick Martens
Director, Center for Cancer Screening



BEVOLKINGS ONDERZOEK BORSTKANKER  **Vlaanderen** is zorg **BEVOLKINGS ONDERZOEK BE** **CvKO** **CENTRUM VOOR KANKEROPSPORING**

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Reminder letter



From barriers to participation: co-creating an effective reminder letter for breast cancer screening among underserved women in Flanders

Allegra Ferrari^{1,2*}, Liesbet Van Bos^{3†}, Sarah Talboom⁴, Wessel van de Veerdonk^{1,2}, Wendy D'haenens³, Marina Pak⁵, Marlies Descan⁶, Stephanie Parmentier⁶, Louise Van Collie⁷, Pascale Sibiet⁸, Mathieu Goossens⁹ and Guido Van Hal¹

Abstract

Background With over 2 million cases diagnosed annually, breast cancer is a leading cause of cancer-related disability and mortality worldwide. Despite global efforts to implement screening programs, uptake rates vary widely across settings due to socioeconomic factors and accessibility challenges. In 2022 in Flanders (Belgium), breast cancer screening participation in municipalities with an income below the poverty line was 15% lower than average.

Methods To tackle the limited participation of underserved women in the breast cancer screening program in Flanders, a culturally sensitive approach was used to investigate factors influencing screening participation and to realize a tailored reminder letter to be tested in a later phase. Working closely with community organizations, 33 women aged 50–69 (29 of whom were non-native Dutch speakers) with low-socioeconomic status were identified to participate in the study. Through an iterative process comprising 3 focus group discussions, 3 Delphi-consultations with sector experts, 1 co-creation session and a final member check, critical insights were gathered.

Results Key barriers included low health literacy and limited understanding of preventive care concepts. Once participants were effectively informed about the breast cancer screening program, they displayed increased help-seeking behaviors in relation to health, underscoring the importance of clear communication in fostering willingness to consider screening. An evaluation of the standard invitation letter employed in the program revealed several challenges related to readability and comprehension. These included the excessive text length, the use of complex vocabulary and grammar beyond an A2 level, slogans unrelated to the mammography appointment (e.g., "We do it and what do you do?"), and the use of generic visuals. At the same time, simplifying the vocabulary to A1–A2 levels, employing straightforward sentence structures, and incorporating relevant visuals enhanced understandability and fostered interest in breast cancer prevention. Utilizing a color palette associated with breast cancer and featuring logos of local authorities instilled a sense of credibility and trustworthiness. Based on this feedback, a revised reminder letter was developed. The final communication was concise and included essential details such as time and place for screening and a QR code providing translation into 12 languages.

[†]Allegra Ferrari and Liesbet Van Bos share co-first authorship.

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Health Belief Model

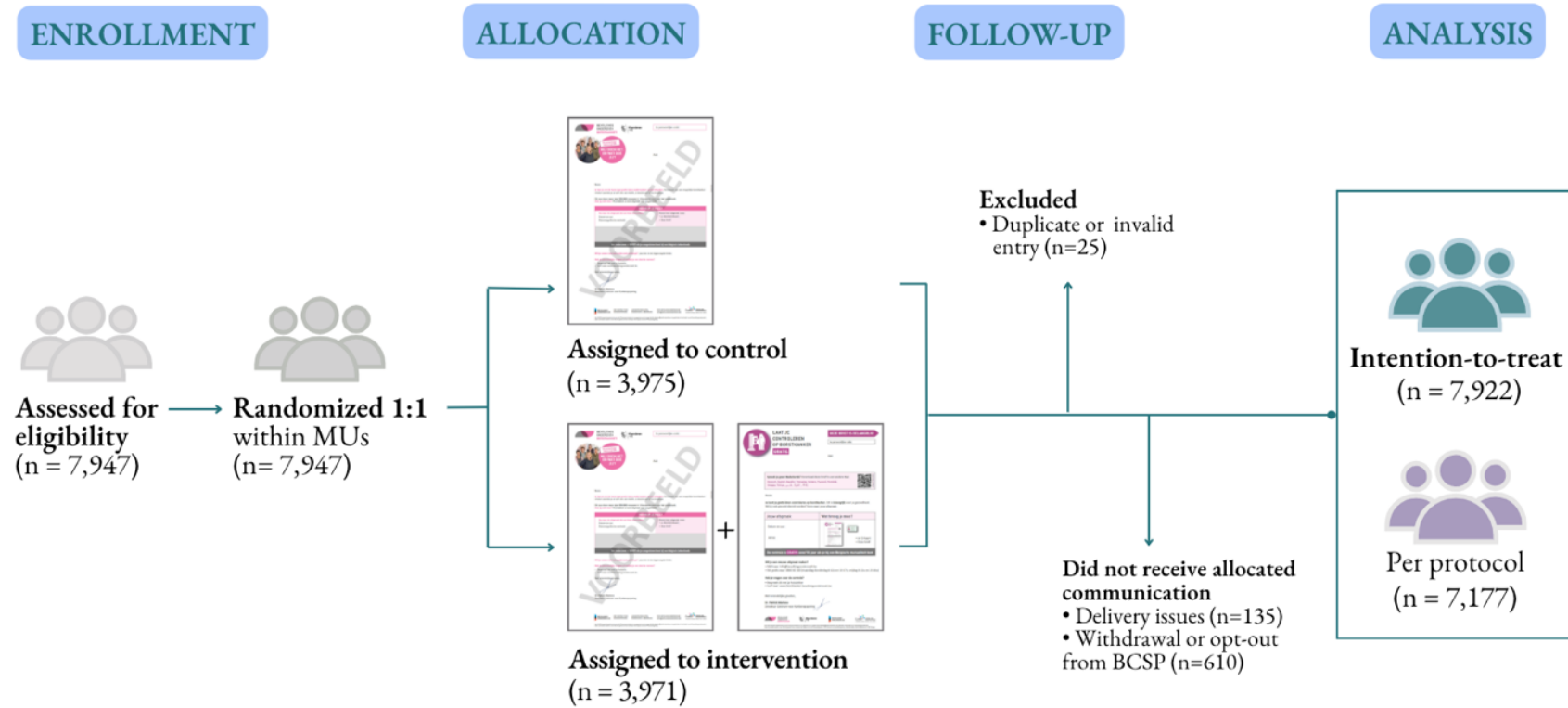
When communication about a prevention programs is unclear, inaccessible, or insufficiently tailored, **perceived barriers may outweigh perceived benefits**, resulting in lower participation.

- The **concept of prevention** may not be equally understood or prioritized across all population groups
- **Cultural appropriateness** is essential to ensure that health communication is relevant, acceptable, and trustworthy.
- EAST framework – Ensure messages are:
 - Easy to understand
 - Attractive to the target audience
 - Socially relevant, and
 - Timely
- Strive to integrate **reflexivity** and **co-creation throughout all stages of the research process**, while recognizing the practical challenges involved.

<https://doi.org/10.1186/s13690-025-01591-7>

ENTER Randomized Controlled Trial ([NCT07472036](https://www.clinicaltrials.gov/ct2/show/study/NCT07472036))

<p>Design: RCT at mammographic unit level</p> <p>Timing: April-June 2024</p> <p>Sample size: 3430 per arm</p> <p>Endpoint: Participation <40 days of invitation</p>	<p>Target group:</p> <ul style="list-style-type: none">• Female aged 50-69• Living in municipalities with low SES scores• Prior non-responder (expected participation ≈10%)
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ENTER Randomized Controlled Trial ([NCT07472036](https://www.clinicaltrials.gov/ct2/show/study/NCT07472036))

Characteristics of Study Population		Total population (n = 7922)	Control arm (n = 3968)	Intervention arm (n = 3954)	
Age group	51-54	2825 (35.7%)	1414 (35.6%)	1411 (35.7%)	p=0.82
	55-59	2040 (25.8%)	1032 (26.0%)	1008 (25.5%)	
	60-64	1897 (23.9%)	955 (24.1%)	942 (23.8%)	
	65-69	1160 (14.6%)	567 (14.3%)	593 (15.0%)	
Province	Antwerp	1962 (24.8%)	979 (24.7%)	983 (24.9%)	p=0.98
	Limburg	1112 (14.0%)	565 (14.2%)	547 (13.8%)	
	East-Flanders	2093 (26.4%)	1046 (26.4%)	1047 (26.5%)	
	Flemish-Brabant	1209 (15.3%)	602 (15.2%)	607 (15.4%)	
	West-Flanders	1546 (19.5%)	776 (19.6%)	770 (19.5%)	
Mammographic unit type	Hospital-based	3430 (43.3%)	1722 (43.4%)	1708 (43.2%)	p=0.97
	Mobile unit	1695 (21.4%)	845 (21.3%)	850 (21.5%)	
	Private radiologist	2797 (35.3%)	1401 (35.3%)	1396 (35.3%)	
Increased reimbursement of medical expenses - proxy low-SES (n = 7544)	Yes	2037 (27.0%)	1212 (32.1%)	825 (21.9%)	p<0.05
	No	5507 (73.0%)	2561 (67.9%)	2946 (78.1%)	

ENTER Randomized Controlled Trial ([NCT07472036](https://www.clinicaltrials.gov/ct2/show/study/NCT07472036))



Control group:
373/3,968 (**9.40%**)

Intervention group:
624/3,954 (**15.78%**)

Participation +6.38%
[OR 1.81 (95%CI 1.58-2.07); <0.001]

Larger increase in the intervention arm among low-SES (+8%, from 4.0% to 12.0%; OR 3.24, 95% CI 2.27–4.61; p<0.001) compared to non-low-SES (+5.2%, from 11.7% to 16.9%; OR 1.53, 95% CI 1.31–1.79; p<0.001) individuals



Diagram of the social-ecological model. Image attribution: By Philroc [CC BY-SA 4.0], from Wikimedia Commons

AIB Technical Meeting 2026: Vaccine records and recall systems in Europe to strengthen adult vaccination

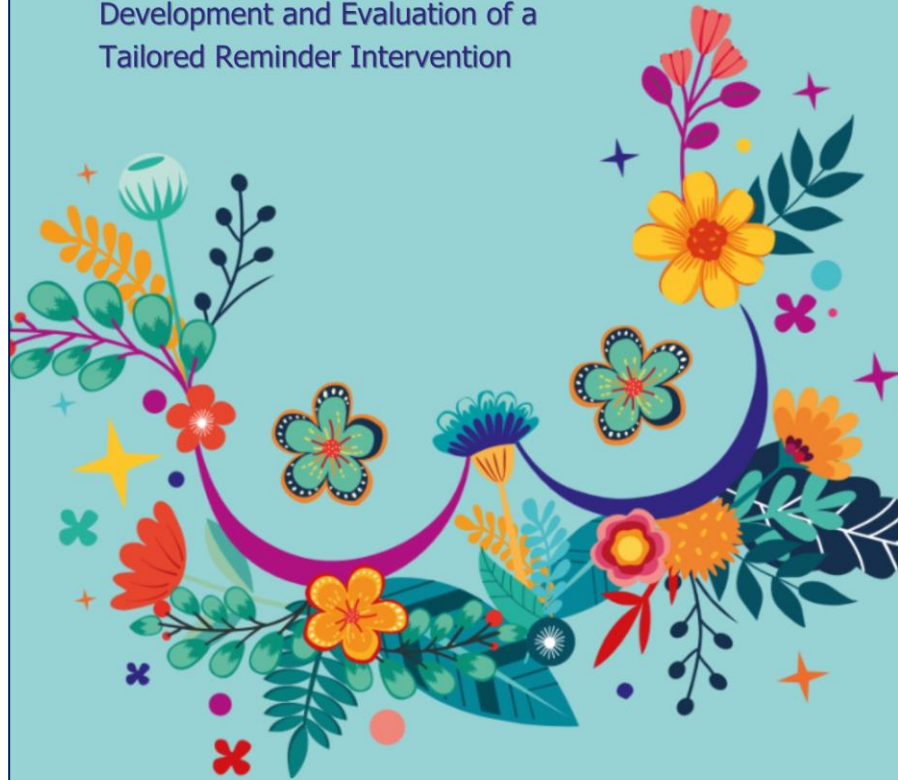


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DI SCIENZE DELLA SALUTE



Tackling Socioeconomic Inequities in Breast Cancer Screening Participation

Development and Evaluation of a Tailored Reminder Intervention



Allegra Ferrari



Allegra Ferrari

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University of Antwerp, Belgium
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