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Differences in mammography screening attendance among non-Western immigrants in Denmark, Finland, Iceland and Norway

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ABSTRACT

Several studies have shown that attendance rates are lower among non-Western immigrants than among natives. As the Nordic countries have quite similar health systems and populations but also differences in the organisation of their organised mammography screening programmes, differences in attendance rates could highlight organisational factors that might increase the attendance rates. Mammography screening is offered free of charge in Denmark and Finland, but not in Iceland and Norway. Contrarily to the other countries, Iceland do not send out pre-booked appointment.

The study population included natives and non-Western immigrants aged 50–69 years, who had at least one invitation to the national mammography screening programmes in Denmark (2008–2017), Finland (2001–2017), Iceland (2001–2020) or Norway (2001–2015). Relative risks (RRs) of attendance were estimated and adjusted for age group and calendar period.

The study population included 116.033 non-Western immigrants and more than 2 million natives. The attendance rates were significantly lower among non-Western immigrants than among natives, with an adjusted relative risk of 0.81/0.80 in Denmark and Finland, 0.62 in Norway, and 0.40 in Iceland. The lower attendance rates among immigrants in Norway and Iceland did not seem to be due to differences in birth country, immigration age, or educational level, but might be explained by organisational factors.

Offering free-of-charge mammography screening in Norway and Iceland and/or including a pre-booked appointment in the invitation letters in Iceland might increase the attendance rate among non-Western immigrants.

1. Introduction

Data from various countries have shown that immigrants do not attend mammography screening as often as natives and that non-Western immigrants have lower attendance rates than other immigrants. (Woods et al., 2018; Schoueri-Mychasiw et al., 2013; Ding et al., 2022; Bhargava et al., 2018) Similar findings have been reported from Nordic countries. (Kristiansen et al., 2012; Lagerlund et al., 2002; Bhargava et al., 2018) Although breast cancer incidence is lower among non-Western immigrants it still constitutes an important threat for non-Western immigrants, which can be reduced by an increased attendance rate among non-Western immigrants. As the non-Western immigrant

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Table 1
Coverage, target groups, fees, pre-booked appointments and translated invitations within the mammography screening programmes in Denmark, Finland, Iceland and Norway.

Country	National coverage	National target group	Fee for screening + assessment	Pre-booked appointment	Invitations in foreign languages[2]
Denmark	2010	50–69 years	Free of charge	Yes	English
Finland	2016	50–69 years[1]	Free of charge	Yes	English
Iceland	1989	40–69 years	26$ (+26 $)	No	None
Norway	2005	50–69 years	26$ (+26 $)	Yes	English

1. One municipality invited women aged 40–74.
2. Only included if available within the study period.

population in the Nordic has increased and is still increasing, it is increasingly important to know how to increase the attendance rate in this population in order to prevent late stage breast cancers and breast cancer deaths.

Several barriers might influence and explain the lower attendance among non-Western immigrants. Identified barriers include psychological/knowledge-related barriers such as fear, lack of knowledge, and embarrassment; logistical barriers such as finances, time, and distance to screening; cultural/immigration-related barriers such as language problems, and cultural modesty. (Miller et al., 2019) As non-Western immigrants constitute an inhomogeneous group it is complicated to extract what type of intervention would increase the attendance rates among non-Western immigrants in all countries. (Schoueri-Mychasiw et al., 2013) The Nordic countries have quite similar health systems and populations but at the same time also differences in the organisation of their organised mammography screening programmes. (Magnussen and Saltman, 2009) If discrepancies in attendance rates among non-Western immigrants exist between the Nordic countries, then attendance rates could potentially be increased in countries with a lower attendance rate, by building on organisational factors from countries with a higher attendance rate.

This study aimed at estimating mammography screening attendance rates among natives and non-Western immigrants in Denmark, Finland, Iceland, and Norway using record linkage between population-based registries. Comparisons were performed to reveal any differences that could be used to increase the attendance rates in some or all of the four countries.

2. Material and methods

2.1. The four screening programmes

Although organised mammography screening programmes started in Denmark, Finland, Iceland, and Norway in the 1980 s and 1990 s, (Tornberg et al., 2006; Sigurdsson and Olafsdottir, 2013) national coverages were only reached in 1989–2016 for women aged 50–69 years (Table 1). (Lund et al., 2018; Mikkelsen et al., 2016; Gabe et al., 2007) Women aged 50–69 years are invited in all four countries, while women aged 40–49 years are also invited in Iceland and one Finnish municipality also invited women aged 40–49 and 70–74 years. (Peintinger, 2019; Parvinen et al., 2015) To get a study population that was comparable across the countries, this study however included only women aged 50–69 years. All four screening programmes invite women biennially. Mammography screening is offered free of charge in Denmark and Finland, whereas a mammography screening after an invitation cost approximately 26 euros in Iceland and Norway (Table 1). (Thy et al., 2022; Altobelli et al., 2017) In Norway, this cost is not deductible on the "exemption card" which all inhabitants in Norway achieve after having paid about 260 euros for visits to public health services, including GP and hospital visits.

If further assessment is needed after a positive screening examination, women in Norway have to pay another 26 Euro (unless they have reached the limit for the exemption card) while women in Iceland had to pay approximately 55 Euros (a few rarer assessments might be more expensive). Women who have health insurance in Iceland never pay more than approximately 150 Euros per month. (Sjúkratryggðir, 0000) Assessments are free of charge in Denmark and Finland. Invitations to mammography screening in Denmark, Finland, and Norway include a pre-booked appointment (that can be rebooked via internet or phone), whereas invitations to mammography screening in Iceland only contain information about how to book an appointment. (Mikkelsen et al., 2016; Gabe et al., 2007; Thy et al., 2022) In Finland an invitation is valid for a year whereas in Denmark, Iceland and Norway invitations do not expire before the upper age of screening is reached. All countries send one reminder to non-participants. During our study period, information about mammography screening was available in English through a webpage referred to in the Danish, Finnish and Norwegian invitation letter. The amount of opportunistic screening is similar in the four countries, ranging between 2.0 % in Iceland to 5.0 % in Norway. (Zielonke et al., 2021).

2.2. Study design and population

The study period was defined as 2008–2017 for Denmark, 2001–2017 for Finland, 2001–2020 for Iceland, and 2001–2015 for Norway. The different study period between the four countries were due to the availability of the data and the start of the national mammography screening programmes. All women registered as living in Denmark, Finland, Iceland, or Norway at some time during the study period were included in the study. Our study population included natives and non-Western immigrants who, at age 50–69 years, had at least one invitation to the national mammography screening programme in the study period, except those women who emigrated within one year after immigration and women who had a missing history of residency or clearly incorrect immigration/emigration dates. Women were censored at their first emigration.

The study population was grouped into natives and non-Western immigrants. We included the EU-member states in Eastern Europe as non-Western as differences in breast cancer risk and maturity of screening programmes between these countries and the remaining Western countries might affect participation rates among immigrants. The non-Western immigrants were further divided into 6 different regions of birth based on birth country. (Appendix, Table A1). Education was defined as the highest achieved education in the study period.

Attendance rates were calculated as the number of women who attended mammography screening after an invitation divided by the number of invited women in the study population. Individual information on natives was not available in Finland, wherefore numbers and attendance rates for natives were calculated from annual statistics.

2.3. Data and definitions

Information on country of birth, residential history, and education was retrieved from the national population registries or the national statistical offices. In Finland and Norway information on invitations and attendances, within the national mammography screening programmes, was retrieved from the national cancer registers. In Iceland and Denmark, this information was retrieved from the Icelandic Directorate of Health and the Danish Quality Database for Mammography Screening. (Mikkelsen et al., 2016).

2.4. Analyses

Attendance rates were calculated for each 10-year age group and 10-

Table 2
Number of native and non-Western women in the study population, who had at least one invitation to the Danish (2008–2017), Finnish (2001–2017), Icelandic (2001–2020) or Norwegian (2001–2015) mammography screening programme, divided into region of origin of non-Western women.

Country	Denmark N(%)	Finland N(%)	Norway N(%)	Iceland N(%)	Total N(%)
study population	873.268.	NA	809.893	68.725	1.751.886[1]
Natives	828.185 (95)	NA	776.786 (96)	64.739 (94)	1.669.710[1] (NA)
Non-Western	45.083 (5)	33.857 (NA)	33.107 (4)	3.986 (6)	116.033 (NA)
Central and South Asia	4.678 (10)[1]	821 (2)[1]	4.874 (15)[1]	69 (2)[1]	10.442 (9)[1]
East Asia and Pacific	7.692 (17)[1]	3.617 (11)[1]	7.462 (23)[1]	1.059 (27)[1]	19.830 (17)[1]
Latin America and Caribbean	1.532 (3)[1]	550 (2)[1]	2.371 (7)[1]	170 (4)[1]	4.623 (4)[1]
Middle East and North Africa	13.172 (29)[1]	1.760 (5)[1]	4.227 (13)[1]	69 (2)[1]	19.228 (17)[1]
Russia and Eastern Europe	15.620 (35)[1]	25.867 (76)[1]	11.812 (36)[1]	2.534 (64)[1]	55.833 (48)[1]
Sub-Saharan Africa	2.389 (5)[1]	1.242 (4)[1]	2.361 (7)[1]	85 (2)[1]	6.077 (5)[1]

[1]Exclusive Finland as only aggregated data on natives are available.
NA: Not Available.

year calendar period, separately for natives and the 6 non-Western immigrants groups. For the entire non-Western immigrants this was further stratified into region of birth, age at immigration (0–19, 20–29, 30–39, 40 + years), and education level (primary 0–9 years or information on educational level missing, secondary 9–12 years, tertiary 12 + years).

In each country, attendance rates were compared between the non-Western immigrant women and the native female population. Non-western migrants were treated as one group in the models. Among Non-western migrants, the analyses were also performed on the impact of age at immigration and education level. Poisson regression models were used to estimate the relative differences in attendance as rate ratios with 95 % confidence intervals adjusted for 10-year age group and 10-year calendar period (adjusted RR). The logarithm of the number of invited women during the follow-up was included as an offset variable. After these pre-analyses, the country-specific estimates and summary statistics were sent to the Finnish Cancer registry where the estimates were pooled together using a random effects model. All statistical analyses were performed using the R program version 4.0.2. To ensure compliance with the European Union's General Data Protection Regulation (article 30) individual data were processed and pre-analysed separately in each Nordic country, with standard R scripts developed by the Finnish Cancer Registry.

2.5. Ethical approvals

According to the European Union's General Data Protection Regulation (article 30), the project was listed on the record of processing activities for research projects in the Central Denmark Region (J. No: 1-16-02-210-20). Data from Finland were used in accordance with the Act of the Finnish National Institute of Health and Welfare (668/2008) and

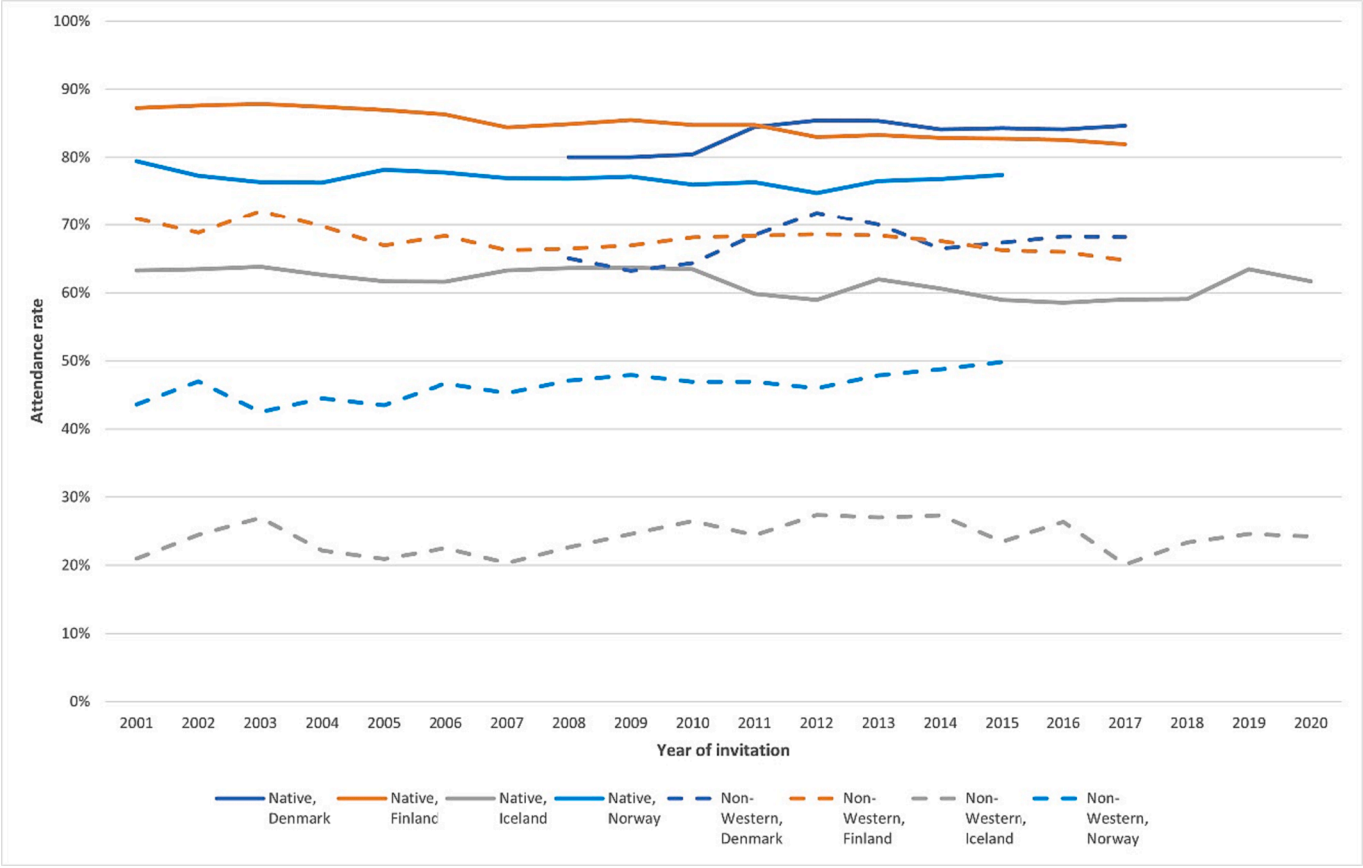

Fig. 1. Yearly attendance rates in the study population by Nordic country, their natives and non-Western immigrants.

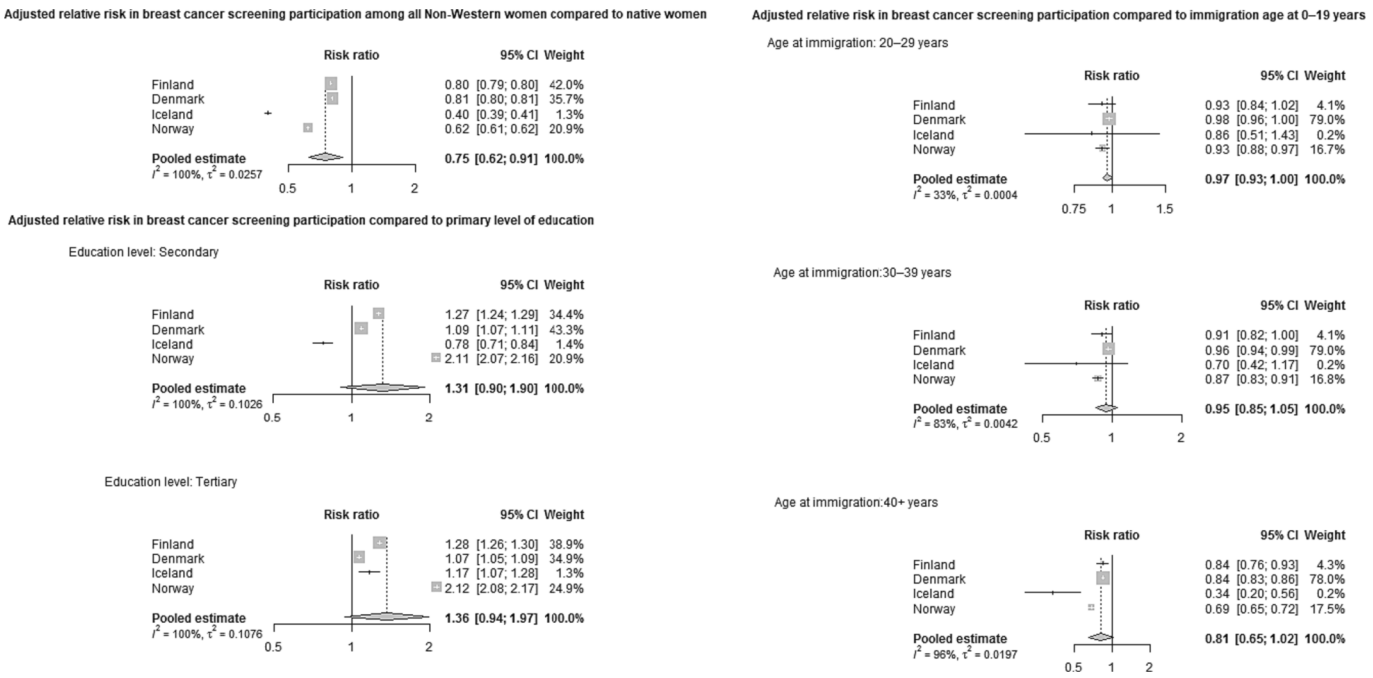

Fig. 2. Adjusted relative risk of attendance within the study period among non-Western immigrant women aged 50–69 years.

based on authorisations (VRK VRK/3059/2018–2 and THL/1081/6.02.00/2018) granted under the Act on Secondary Use of Health and Social Data (552/2019). The study was approved by The National Bioethics Committee of Iceland (VSN-20-204, VSN-20-204-V1, VSN-20-204-V2).

3. Results

Our study population consisted of 116.033 non-Western immigrants and more than 2 million natives. The proportion of non-Western immigrants was quite similar in Denmark, Iceland, and Norway, i.e. 4–6 % of the study population (Table 2). However, the origin of non-Western immigrants differed substantially between the four countries. While immigrants from Russia and Eastern Europe constituted 76 % and 64 % of the non-Western immigrants in Finland and Iceland, this percentage was only 35–36 % in Denmark and Norway (Table 2). Immigrants from the Middle East and North Africa constituted 29 % of the non-Western immigrants in Denmark, while this percentage was only 2–13 % in Finland, Iceland, and Norway.

From 2008 onwards, the average attendance rate, among natives, was approximately 84 % in Denmark and Finland, 77 % in Norway, and 61 % in Iceland, while the corresponding rates were 68 %, 48 %, and 25 % for non-Western immigrants. (Fig. 1) Compared to natives, non-Western immigrants had an adjusted relative risk of attendance of 0.81/0.80 (95 % CI:[0.80;0.81]/[0.79;0.80]) in Denmark and Finland, 0.62 (95 % CI: [0.61;0.62] in Norway and 0.40 in Iceland (95 % CI: [0.39;0.41] (Fig. 2). The high adjusted relative risk in Finland is mostly due to a high attendance rate in their biggest immigrant group from Russian and Eastern Europe (Fig. 3).

The attendance rates decreased with increasing age at immigration (Fig. 2). The attendance rates were significantly lower in all four Nordic countries among those who immigrated at age 40 + and slightly lower for those who immigrated at age 20–29 years or 30–39 years compared to those who immigrated at age 0–19 years. The decreases were more pronounced in Iceland and Norway. The pooled data showed no significant differences between non-Western immigrants who immigrated at age 40 + years, 30–39 years or 20–29 years compared to those who immigrated at age 0–19 years (adjusted RR:0.81 [0.65–1.02]; 0.95 [0.85–1.05] and 0.97 [0.93–1.00], respectively). In Denmark, only 29 % of invited non-Western immigrants had immigrated at age 40 or older, while this proportion was 57 %, 65 %, and 46 % in Finland, Iceland, and Norway, respectively.

Having a secondary or tertiary education did not significantly increase the likelihood of attendance compared to women with a primary or missing education (pooled adjusted RR: 1.31 [0.90–1.90]; 1.36 [0.94–1.97], respectively). However, these adjusted relative risks varied substantially between the four Nordic countries (Fig. 2). While 40–45 % of non-Western immigrants invited to mammography screening had primary or missing education in Denmark, Finland, and Iceland, this proportion was 75 % among non-Western immigrants in Norway (Table 3). This difference is though due to a high proportion of missing data on education among immigrants in Norway.

In Denmark, Finland, and Norway natives had the highest attendance rate while immigrants from 'Sub-Saharan Africa' and 'Central and South Asia' had the lowest attendance rate (Fig. 3). The same pattern was seen in Iceland although the yearly attendance rates varied quite a lot due to small numbers.

4. Discussion

Compared to natives, a significantly lower proportion of non-Western immigrants attended mammography screening when invited. The adjusted relative risk of attendance among non-Western immigrants compared to natives was 0.81/0.80 in Denmark and Finland, 0.62 in Norway, and 0.40 in Iceland. Non-attendance was more frequent among non-Western immigrants who immigrated after age 40 + and among those with a primary/missing education. The observed differences between the four Nordic countries might be used to identify strategies that could increase attendance rates among non-Western immigrants.

4.1. Improving attendance rates among non-Western immigrants

The completeness of educational level data in Norway was low in our study. However, other sources such as the Nordic Statistics database (https://www.nordicstatistics.org) have data with a much higher completeness, showing that the educational level of immigrant women aged 50–64 is equal or higher in Norway than in Denmark. As immigration age is neither that different among non-Western immigrants in

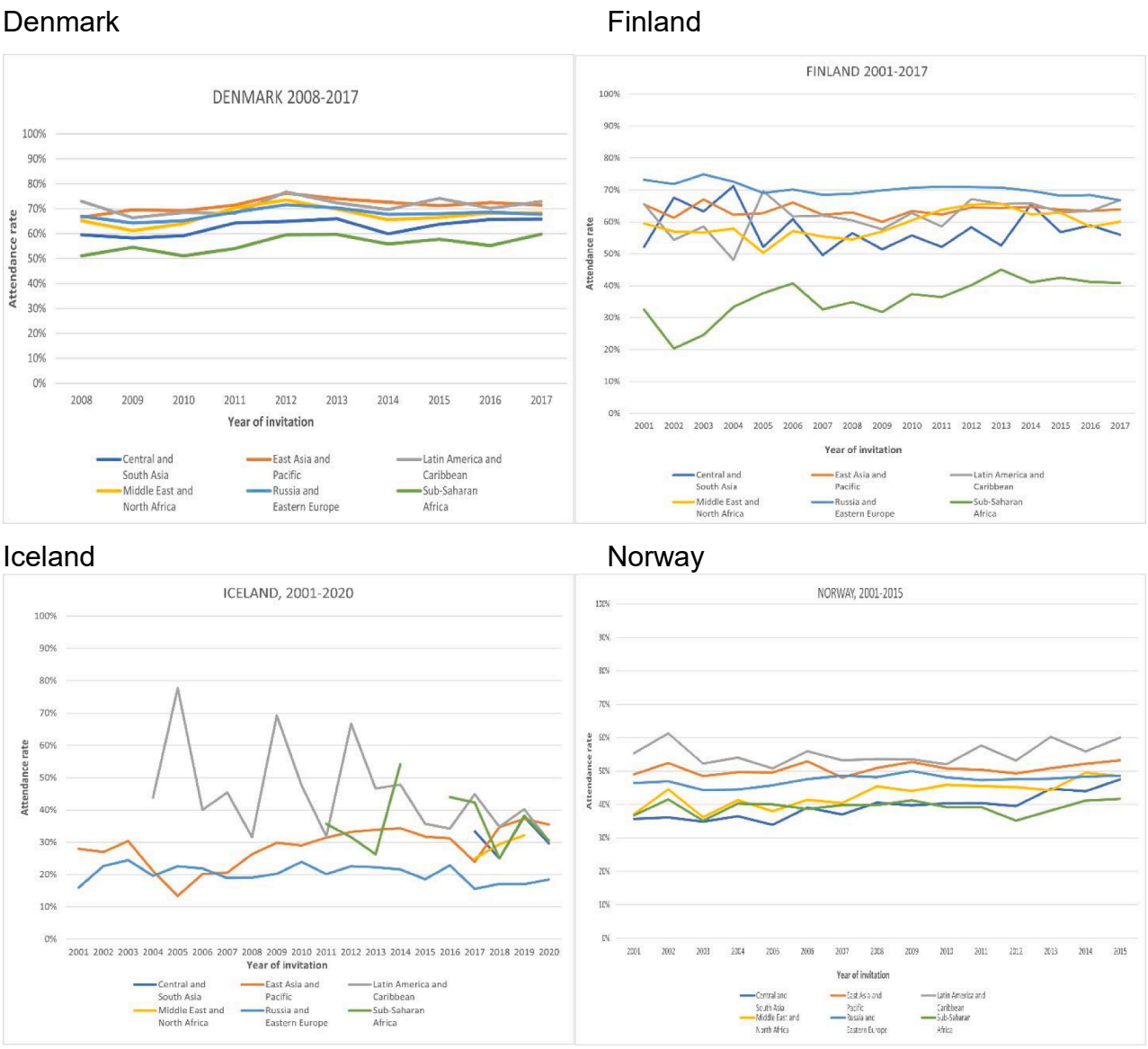

Fig. 3. Attendance rates within the study period among non-Western immigrants aged 50–69 years by Nordic country and region of birth.

Table 3
Educational level and immigration age in the study populations by Nordic country.

	Denmark N (%)	Finland N (%)	Iceland N (%)	Norway N (%)
Educational level				
Primary or missing	43	40	45	75*
Secondary	34	29	35	12*
Tertiary	23	31	20	14*
Immigration age				
0–19 years	12	1	0	3
20–29 years	28	14	10	22
30–39 years	32	28	24	28
40 + years	29	57	65	46

*Low completeness of data on the education level for Norwegian immigrants.

Norway/Iceland and Denmark/Finland (Table 3), the low attendance rate among immigrants can not be explained by differences in educational level or immigration age. Even though the high attendance rate among immigrants in Finland is heavily affected by the high attendance among their largest immigrant group from Russia and Eastern Europe, the attendance rate is still higher among all other immigrant groups in Finland compared to Iceland and Norway, except for the small group of immigrants from Sub-Saharan Africa which have a similar attendance rate in Finland and Norway. Similarly the attendance rate is higher among all immigrant groups in Denmarks compared to Iceland and Norway. The low attendance rate among immigrants in Iceland is heavily affected by a low attendance among their largest immigrant group form Russia and Eastern Europe, probably due to immigrants seeking health care at their country of origin. However, the attendance rate is also lower among all other immigrants groups in Iceland compared to Norway. The differences in attendance rates between the 4 countries can therefore neither be explained by differences in country of origin.

The observed differences within the four Nordic countries might be due to organisational factors. The Norwegian and Icelandic mammography screening programme are not free of charge. This might defray some non-Western women as well as native women, especially those with minor financial resources, from participating in mammography screening. This is in line with a qualitative study among 16 Norwegian

Pakistani women which identified monetary expenses as one of the hindered mammography screening attendance. (Bhargava et al., 2019) Women are regularly contacting the call centre for BreastScreen Norway to cancel their appointment due to cost or delay their appointment until the pension has arrived. However, we do not know whether these are natives or immigrants.

The Danish, Finnish, and Norwegian mammography screening programmes send out invitations that include a pre-booked time for the screening, whereas the Icelandic programme sends out invitations without pre-booked appointments. A recent systematic review showed moderate-certainty evidence that a letter with a fixed appointment to attend increased attendance in cervical cancer screening, as compared to a letter with an open invitation to make an appointment (RR 1.61, 95 % CI 1.48 to 1.75; 5742 participants; 5 studies). To our knowledge, no studies have investigated whether attendance in mammography screening could be increased by sending out invitations with pre-booked appointments, but it seems likely that this would also be true in mammography screening and perhaps even more important for those non-Western immigrants who do not speak the local language.

It might therefore be possible to increase the attendance rate among non-Western immigrants in Norway and Iceland by offering free-of-charge mammography screening and including a pre-booked appointment in the Icelandic invitation letters.

4.2. Strengths and limitations

This study included more than 1.7 million women who had at least one invitation to the Danish, Finnish, Icelandic, or Norwegian mammography screening programme. All data were retrieved from high-quality registers which were linked using the unique personal identification numbers used in all Nordic countries. We thereby avoided selection bias and recall bias. Besides this, the major strength of this study is that we had population-wide data from a large study population and that all definitions and analyses were performed in the exact same way as the script was exactly the same.

The completeness of data on the education level for immigrants was low in Norway, wherefore we do not know to what extent the low attendance rate among non-Western immigrants living in Norway can be explained by a lower educational level among non-Western immigrants in Norway. The very high relative risk of attendance among women with secondary/tertiary education in Norway might probably also be affected by this low completeness of educational data. Non-Western immigrants who emigrated shortly after the invitation to mammography screening were not excluded from the analysis. This might have underestimated the attendance rates among immigrants slightly, but could not have had any major effect on our results.

4.3. Other studies

Several previous studies have found that compared to natives, fewer non-Western immigrants choose to participate in mammography screening when invited. (Woods et al., 2018; Ding et al., 2022) Von Euler-Chelpin et al found the attendance rate among those invited to the Copenhagen mammography screening programme in 1991–2008 to be 78 % among natives, 67 % among Western immigrants, and 61 % among non-Western immigrants. (Kristiansen et al., 2012) Their attendance rates were lower than our more recent Danish attendance rates, reflecting that the attendance rate has increased in the past decade. Our adjusted relative risk for attendance of 0.8 among Danish non-Western immigrants compared to natives are similar to the crude relative risk in the von Euler-Chelpin et al study (0.61/0.78 = 0.78). A recent study from Norway reported that 77.5 % of native women participated when invited to mammography screening during the period 2010–2019. (Thy et al., 2022) The similar attendance rates were 51.5 % for non-Western immigrants. These attendance rates are similar to the attendance rates reported in this study, although we found a slightly lower attendance rate among non-Western immigrants. This slight discrepancy is most likely due to slightly different study periods in the two studies.

4.4. Implications for clinical practise and future research

Reducing barriers to mammography screening will increase the attendance rates. From our study it seems likely that free-of-charge screening and pre-booked appointments could reduce some of the barriers and thereby increase the attendance rates among non-Western immigrants. Our study shown that this influence is not negliable, wherefore it might be a good idea to remove these barriers. As this will though increase the costs of the screening programmes these costs should be weighed against the cost and burden (for the health care system or the individual women) of finding the breast cancers at a later stage among women who do not attend screening.

Reducing barriers as fees and non pre-booked appointments might also increase attendance rates among subgroups of natives and Western/Nordic immigrants. Identifying these subgroups was though beyond the scope of this article.

5. Conclusion

The difference between attendance rates among natives and non-Western immigrants is significantly lower in Denmark and Finland than in Iceland and Norway. This difference might be explained by organisational differences between the four screening programmes, wherefore it might be possible to increase the attendance rate among non-Western immigrants in Norway and Iceland by offering free-of-charge mammography screening, and among non-Western immigrants in Iceland by including a pre-booked appointment in the invitation letters.

Disclosure

Solveig Hofvind is head of BreastScreen Norway. All other authors had no competing interests.

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CRediT authorship contribution statement

Sisse Helle Njor: Conceptualization, Investigation, Methodology, Validation, Writing – original draft. **Sirpa Heinävaara:** Investigation, Methodology, Validation, Writing – review & editing. **Hrefna Stefansdóttir:** Formal analysis, Investigation, Writing – review & editing. **Mari Nygård:** Investigation, Writing – review & editing. **Eva María Guðmundsdóttir:** Investigation, Writing – review & editing. **Sameer Bhargava:** Validation, Writing – review & editing. **Aku Leivonen:** Formal analysis, Investigation, Writing – review & editing. **Suzanne Campbell:** Formal analysis, Investigation, Writing – review & editing. **Bo Søborg:** Formal analysis, Investigation, Writing – review & editing. **Solveig Hofvind:** Validation, Writing – review & editing. **Tytti Sarkeala:** Conceptualization, Funding acquisition, Investigation, Methodology, Writing – review & editing. **Ilse Vejborg:** Investigation, Validation, Writing – review & editing. **Maarit Lamminmäki:** Conceptualization, Investigation, Methodology, Project administration, Validation, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Table A1
Countries included in each region of birth.

Region of birth	Country
Central and South Asia	Afghanistan, Armenia, Azerbaijan, Bangladesh, Bhutan, Ceylon, Georgia, India, Kazakhstan, Kyrgyz Republic, Maldives, Nepal, Pakistan, Sri Lanka, Tajikistan, Tajikistan, Turkmenistan, Uzbekistan
East Asia and Pacific	American Samoa, Brunei, Burma, Cambodia, China, Fiji, Hong Kong, Indonesia, Japan, Korea, Dem. People's Rep., Lao PDR, Macao, Malaysia, Mongolia, Myanmar, Papua New Guinea, Philippines, Republic of Korea, Samoa, Singapore, Solomon Islands, South Vietnam, Taiwan, Thailand, Vietnam
Latin America and the Caribbean	Antigua and Barbuda, Antilles, Argentina, Aruba, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Curacao, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, St. Kitts and Nevis, St. Lucia, St. Martin, Suriname, Trinidad and Tobago, Turks and Caicos Islands, Uruguay, Venezuela
Middle East and North Africa	Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Palestine, Qatar, Saudi Arabia, South Yemen, Syria, Tunisia, Turkey, United Arab Emirates, Yemen
Russia and Eastern Europe	Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Czechoslovakia, Estonia, Hungary, Kosovo, Latvia, Lithuania, Moldova, Montenegro, North Macedonia, Poland, Romania, Russia, Russian Empire, Serbia, Slovak Republic, Slovenia, Soviet Union, Ukraine, Yugoslavia
Sub-Saharan Africa	Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, rep., Cote d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Ovamboland, Rhodesia, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, South West Africa, Sudan, Tanganyika, Tanzania, Togo, Uganda, Zaire, Zambia, Zimbabwe

Data availability

The data that has been used is confidential.

Appendix

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