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Migrant and ethnic inequalities in cervical cancer screening: exploring the role of cultural health capital using data from the Belgian Health Interview Survey

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Abstract

Background Preventive cancer screenings improve health outcomes, yet inequalities in access to and engagement with cervical cancer screening persist among minoritised populations, particularly migrants and ethnically minoritised groups. This study examines whether inequalities in the accumulation of health-related cultural resources (knowledge, values, and skills that individuals can use to promote their health) help explain ethnic disparities in cervical cancer screening within a European context, drawing on the theoretical concept of "cultural health capital".

Methods Using data from the 2013 and 2018 Belgian Health Interview Surveys ($n = 6{,}247$), we employed logistic regression models to explore the relationships among migrant background, cultural health capital (reflecting primary prevention, secondary prevention and healthcare provider engagement), and cervical cancer screening participation, controlling for socioeconomic and health factors.

Results We identified persistent migrant and ethnic disparities in screening, even after adjusting for socioeconomic and cultural health capital factors. Although cultural health capital accumulation patterns varied considerably across migrant backgrounds and were consistently linked to increased cervical cancer screening uptake, these associations did not fully account for the observed inequalities. Notably, first-generation non-European migrants gained fewer benefits from higher cultural health capital.

Conclusions Our results highlight the importance of considering intersecting factors such as length of residence, racialisation and ethnicization, in shaping cultural health capital accumulation. While cultural health capital correlates positively with cervical cancer screening uptake for most groups, it does not fully explain the observed disparities, underscoring the role of systemic barriers in perpetuating inequalities. Future studies should refine cultural health capital measurement and investigate the barriers that diverse populations encounter in their cultural health capital accumulation process.

Keywords Ethnic inequalities, Prevention, Cultural health capital, Cervical Cancer screening

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Introduction

Preventive healthcare plays a crucial role in improving health outcomes, yet disparities in access and engagement persist among various populations, particularly migrants and ethnically minoritised groups [1]. In Europe, for instance, non-western migrant women have lower cervical cancer screening participation rates compared to non-migrant populations, even when socioeconomic factors like income and education are accounted for [2]. While individual factors such as language barriers and self-efficacy are often cited as key determinants of these health disparities, it is important to move beyond these personal factors and examine the wider structural conditions that shape healthcare access [3]. A more comprehensive understanding of these inequalities can be gained by applying Bourdieu's theory of capital, which emphasizes how access to economic, social, and cultural resources shapes individuals' opportunities and behaviours across various domains, including healthcare [4–6]. These resources are furthermore not simply individually possessed, but are embedded within and shaped by broader structures of power and inequality, which govern access to resources, influence their accumulation over the life course, and contribute to the intergenerational transmission of social advantage or disadvantage [7]. Research indicates that both economic and social capital are related to greater utilisation of preventive healthcare [8, 9] and that these two forms of capital play a role in shaping immigrant-related and ethnic inequalities in health [10].

Cultural capital, broadly described as the knowledge, values, and skills a person accumulates through the long-lasting process of socialisation, has been relatively underexplored in healthcare research [6]. Scholars have however argued for the importance of health-related cultural capital, thereby contributing to the emerging theory of *cultural health capital* [5, 11, 12]. Cultural health capital (CHC) refers to a person's health knowledge (e.g., understanding a healthy diet), health values (e.g., the importance they attribute to disease prevention), and health skills (e.g., the ability to effectively navigate healthcare systems) that are put forward towards positive healthcare management and are embodied through health-promoting practices [13]. Importantly, following Bourdieu's theoretical framing, cultural capital is not simply an individually accumulated resource but is shaped, constrained, and valued differently across social hierarchies and institutional contexts [7, 13]. Access to and the effectiveness of CHC thus depend not only on individual attributes, but also on broader systemic conditions, including structural inequalities, discrimination, and healthcare systems' organisation [7]. This paper therefore seeks to address this literature gap by examining how CHC shapes migrant and ethnic disparities in cervical cancer screening (CCS) uptake.

Though CHC draws parallels with the concept of health literacy, it incorporates and expands upon it further by focusing on a person's embodied practices and behaviours rather than solely their self-declared values and knowledge [12, 14]. While health literacy reflects a person's understanding of health information, it does not always result in concrete health actions [15]. In contrast, embodied practices, which are ingrained in daily life, may more accurately predict future health behaviours than health literacy alone [16]. CHC addresses this distinction by emphasising that consistent engagement in health-promoting behaviours is a manifestation of a person's health knowledge, values, and skills [5, 12]. The accumulation of capital over time is therefore a core CHC principle, arguing that the more a person interacts with others and with healthcare providers that reward their engagement in health-promoting behaviours, the greater the likelihood of further positive health behaviours in the future [11, 12]. As demonstrated by the influence of childhood cultural conditions on later health behaviours in adulthood, this accumulation process begins early in life and continues throughout the lifespan [17]. Although not always conceptualised as CHC, existing research shows that CHC-related behaviours correlate with higher cancer screening uptake. Engaging in lifestyles and behaviours that promote health, such as avoiding cigarette smoking, excessive alcohol consumption [18] and poor diets [19]—also considered *primary prevention*—are positively linked to cancer screening participation. This trend also applies to *secondary prevention* practices, including early detection through regular health screenings [20]. Attending routine check-ups with a general practitioner (GP) was also found to be positively associated with greater engagement in cancer screening [21]. Building on these findings, proponents of the concept of CHC argue that as patients accumulate higher CHC levels, they may receive more favourable healthcare provider attention, potentially enhancing sustained healthcare engagement [5, 17].

Previous work further illustrates how CHC-related factors serve as an intermediate mechanism through which socioeconomic inequalities manifest in cancer screening and other health-related outcomes. This research argues that individuals with greater socioeconomic resources engage more frequently in general health-preserving behaviours, in part due to possessing higher levels of health literacy, their increased exposure to health-promoting environments, and better access to healthcare services [5, 17, 22]. These advantages provide them with more opportunities to stay informed about health risks, access preventive care, and build health knowledge, which further facilitates effective engagement with the

healthcare system [23, 24]. In contrast, individuals with lower socioeconomic status (SES), facing limited access to these resources, are less likely to accumulate CHC, often experiencing more fragmented healthcare and reduced opportunities to develop the skills necessary for navigating complex healthcare systems [25]. As a result, the gap in screening participation widens, reinforcing broader structural inequalities [5].

Building on this body of research, our study is positioned at the intersection of CHC and migrant- and ethnic-related inequalities. While the following discussion initially focuses on migration-related processes that shape CHC accumulation, we subsequently expand the analysis to address how racialisation and ethnic minority status of the second generation further influence healthcare engagement, independently of direct migration experience. We argue that migrants accumulate CHC through distinct processes, and anticipate that CHC-related factors migrant-related disparities in CCS. Sociological work on the topic has found that migration often demands adapting one's cultural capital to new environments, requiring first-generation immigrants to negotiate resources and strategies for navigating unfamiliar healthcare systems [26]. Such adaptation, influenced by language barriers, unfamiliar institutional practices, and complex healthcare systems, can substantially affect health behaviours and access to care [27]. Moreover, CHC reflects structural inequalities that first-generation Non-Western immigrants often encounter in Western destination contexts as barriers in access to education, employment, and income opportunities hinder their ability to build the health-related capital needed for equitable healthcare engagement [28]. Thus, CHC may serve as an intermediary mechanism in migration-related health inequalities, as migrants with lower CHC levels face compounded challenges in accessing preventive care.

Migrants furthermore constitute a highly diverse population, likely leading to varied patterns of CHC accumulation. We therefore anticipate differences in CHC based on years since migration and region of origin, particularly since individuals from non-European regions often belong to racialised groups—a key factor shaping health disparities [29]. Longer residence in a new country may foster more extensive interaction with the healthcare system and broader exposure to health-related information, thus increasing context-specific CHC [27]. European immigrants in other European countries may, furthermore, already hold relevant CHC or find it easier to adapt existing resources—partly due to healthcare similarities across Europe but also the more inclusive integration policies they are granted—thus facilitating their healthcare engagement [30]. In contrast, non-European immigrants and racialised groups in Europe often face discrimination across multiple spheres, including housing, employment, and healthcare [31–33].

We thus propose three hypotheses. Firstly, we expect immigrants and racialised ethnic minorities to have lower levels of host-country CHC than the majority population (Hypothesis 1), with notable differences by origin (Hypothesis 1a) and settlement duration (Hypothesis 1b). It is also important to consider the so-called "second generation" —descendants of immigrants whose circumstances differ from those of their parents but who may still belong to racialised and ethnicised groups. Although this growing subpopulation generally benefits from greater exposure to local education, institutions, and healthcare systems, its patterns may still differ from the majority (Hypothesis 1c) [34]. Studies indicate that racialised children of immigrants encounter racism earlier in life than their parents, enduring more pronounced and cumulative health consequences over the lifespan [35]. They also inherit parental disadvantages and face persistent systemic discrimination in adulthood [36]. These inequalities illustrate how racialisation continues to impede equitable healthcare engagement for second-generation populations of non-European origin, despite their greater familiarity with local contexts.

Secondly, we expect the previously documented association between CHC and cervical cancer screening (CCS) (Hypothesis 2) to hold in our study population, as CHC typically correlates with greater healthcare engagement. Yet, for ethnic minorities and immigrants, the translation of CHC into actual CCS uptake may be more complex.

Therefore, we lastly aim to clarify how CHC operates across diverse migrant-background groups and whether it correlates similarly with CCS (Hypothesis 3). While higher CHC may positively relate to screening among some groups, it may not yield equivalent benefits for two main reasons. First, although in European contexts CCS is widely accepted as a preventive healthcare measure, the procedure may hold different meanings for first-generation immigrants and racialised minorities—especially those with prior negative encounters in gynaecological care, or where such examinations are sensitive and taboo [37]. The intimate and invasive nature of CCS, requiring close interaction with healthcare providers may not align with certain preferred care modalities, thus limiting uptake [38, 39]. Second, even immigrants and racialised minorities who exhibit high CHC and embrace so-called health-promoting values may struggle to act on their knowledge due to discrimination within healthcare settings [31]. Bias against those with a migrant-background can therefore undermine preventive care engagement, as the decision to undergo a cervical cancer screening may therefore involve weighing the potential benefits of cancer prevention against the risk of experiencing a negative or discriminatory encounter. Likewise,

second-generation descendants may accumulate more CHC than first-generation immigrants, yet still confront racism linked to perceived foreignness, restricting their access to quality healthcare information and services [40].

In this study, we refer to observed disparities as 'ethnic inequalities' while primarily analysing populations categorised by migrant background. We acknowledge that this terminology entails conceptual limitations. In the Belgian and broader European context, systematic data collection on racial or ethnic identity is limited due to historical sensitivities and a reluctance to engage with 'ethnicity' and 'race' as a scientific or legal category [41]. Consequently, researchers often use country of birth and parents country of birth (i.e. migration-background) as an imperfect proxy for racial or ethnic minority status [41]. However, the majority of non-European migrants and second-generation descendants of non-European origin in Europe are subject to racialisation processes and are perceived and treated as 'Other' based on visible, cultural, or national markers [42]. These processes can result in differential healthcare access and treatment that mirror those typically associated with racial or ethnic discrimination, even if only measured by country of birth or parents' country of birth [42].

This study examines the extent to which differences in CCS participation among immigrant and ethnic minority groups are associated with CHC, and how this relationship varies. First, we assess CCS disparities by immigrant and ethnic origin, controlling for socioeconomic factors (Research Objective 1), and then explore the relationship between CHC and CCS uptake (Research Objective 2), as previously established [5]. Next, we investigate whether patterns of CHC accumulation vary by migrant-background (Research Objective 3). Finally, we examine how CHC interacts with migrant-background to produce different outcomes in screening participation (Research Objective 4). Findings from this study could carry direct implications for health policy, underscoring the importance of investing in interventions aimed at fostering cultural health capital to encourage preventive behaviours like cancer screening among women from diverse backgrounds.

Methods

Setting

Belgium provides an ideal setting for this analysis due to its large, diverse population, shaped by multiple migration histories. Almost one fifth of the population are first-generation immigrants, with the largest group originating from EU15 countries, followed by migrants from North Africa, Turkey and the Middle East, and Sub-Saharan Africa [43]. This diversity reflects not only European mobility and historical labour migration, but also Belgium's colonial legacy in the Democratic Republic of Congo, Burundi, and Rwanda. Furthermore, although second-generation descendants constitute 13.7% of the population, their healthcare experiences and how this is reflected in observed healthcare disparities remain largely understudied in this setting [43].

Belgium aligns its cervical cancer screening programme with European guidelines. Since 2013, a population-based screening programme whereby women receive a letter inviting them to be screened has been in place at the Flemish regional level. Across all three Belgian regions, until 2024, the recommendation was one cytological screening (Papanicolaou smear) every three years for all women aged 25 to 64, performed by a GP or gynaecologist[1]. Cervical cancer screening is fully reimbursed if participants follow the recommended frequency and if the GP or gynaecologist practices within the health insurance system, which currently covers 99.1% of the population [45]. However, participants must still pay a copayment for their consultation, ranging from 4 euros for a GP to up to 30 euros for a gynaecologist.

Study design and data

We used data from the 2013 and 2018 waves of the Belgian Health Interview Survey (BHIS), a cross-sectional, nationally representative health survey conducted every five years. The BHIS collects information on health status, health-related behaviours, and healthcare access. Data are gathered through face-to-face interviews and self-administered questionnaires. The target population includes all individuals residing in Belgium, with participants drawn from the national population register using a multistage, stratified sampling design. Survey weights ensure representativeness by age, sex, and province. Individuals not in the population register, such as those awaiting residence permits, are excluded. Questionnaires were provided in Belgium's three official languages (Dutch, French, German) and English; if the respondent could not speak any of these languages, a household member served as a proxy, or a field substitution occurred. In our sample, first-generation immigrants comprised 22.4% and second-generation individuals 10.4%, indicating slight oversampling of the first generation and slight under sampling of the second. Full details of the methodology and the study questionnaire can be found elsewhere [46, 47].

Participant characteristics

We included all women aged 25–67 in our subsample, as this reflected the eligible age criteria for receiving reimbursed CCS Belgium (25–64). We further included

[1] Starting in 2025, this recommendation changed to a primary HPV test every five years for women over 30 [44].

women up until age 67 as women are asked to report on pap smears taken in the three years prior.

Variables

Dependent variable

Compliant cervical cancer screening is measured through a binary response variable that corresponds to the recommended interval for compliant CCS participation. This is defined as having one screening every three years, hence in our sample, women are asked if they have had a CCS in the past three years (yes/no).

Independent variable

Migrant-background was defined by generation, region of origin, and years since arrival. First-generation immigrants were those born abroad to non-Belgian parents; second-generation descendants were born in Belgium with at least one parent born outside Belgium. Individuals born in Belgium to Belgian-born parents constituted the native majority. Regions of origin were categorised as Belgian, European, or Non-European. While these categories serve as proxies for ethnicity, they are informative given that the majority of Non-European second-generation individuals in Belgium belong to racialised minorities. First-generation immigrants were further divided into recent arrivals (< 10 years) and longer-term immigrants (≥ 10 years).

Cultural Health Capital (CHC) was measured through three dimensions: primary preventive lifestyle behaviours, secondary preventive healthcare engagement, and healthcare interactions. For primary prevention, we used three categorical variables reflecting hours of leisure-time physical activity (sedentary, < 4 h/week, > 4 h/week), daily vegetable intake (≥ 5 servings/day), and daily fruit intake (≥ 4 servings/day) based on WHO guidelines [48]. Secondary prevention was assessed via binary indicators for blood pressure screening (within 5 years), blood sugar screening (within 3 years), and cholesterol screening (ever). Healthcare professional interactions included GP visits (never, > 12 months ago, or within the last 12 months), specialist consultations (within the last 12 months), and dentist visits (within the last 12 months).

Two of the variables (physical activity and GP visits) were coded on an ordinal scale from 0 to 2, where 0 represented lower CHC (i.e., no leisure-time physical activity and never visiting the GP) and 2 represented higher CHC (i.e., > 4 h/week of leisure-time activity and a GP visit within the last 12 months). All other variables (vegetable and fruit intake, blood pressure, blood cholesterol and blood sugar screenings, and specialist/dentist visits) were coded as binary yes/no responses. The variables through which we operationalise each dimension were summed into separate scales, and each scale was dichotomised at the median.

Control variable

We adjusted for various sociodemographic and socioeconomic variables. As we anticipated a curvilinear association between age and CCS [49, 50], our models include both age and agesquared as continuous covariates. Household composition—categorised as "Single," "Single parent with children," "Couple without children," "Couple with children," or "Other/unknown"—was also included, given its potential influence on available time and resources for healthcare. Region was also controlled for, acknowledging that healthcare policies, socioeconomic conditions, and demographics vary across Belgium's three regions (Flanders, Wallonia, and the Brussels-Capital Region). We included survey year to account for temporal changes in CCS uptake between 2013 and 2018. Finally, we adjusted for health status through two indicators, as individuals in poorer health may have more frequent healthcare contact. Self-rated health was assessed on a five-point Likert scale ranging from "Very good" to "Very bad," and the number of chronic conditions was categorised as none, one, two, or three or more. We additionally adjusted for socioeconomic factors by including education and income as covariates. Education was grouped into three categories: no or lowersecondary education, uppersecondary education, and tertiary education. Equivalised household income, calculated with the OECD 1982 equivalence scale, was then divided into national quintiles [51].

Imputation

We addressed missing data using the Multiple Imputation by Chained Equations (MICE) algorithm in R [52]. Table 1 provides an overview of missing data, and Supplementary Table S1 a more detailed distribution. We used complete sociodemographic variables (migrant-background, age, household composition, survey year, region of residence) to predict socioeconomic variables, cultural health capital measures, and cancer screening uptake. We created 30 imputed datasets, specifying 10 iterations per imputation to ensure convergence. Predictive mean matching was applied for continuous variables, logistic regression for binary variables, and polytomous logistic regression for ordinal variables. We evaluated imputation quality by comparing observed and imputed data distributions and examining trace plots to verify proper convergence.

Statistical analysis

We performed logistic regression analyses in five stages to identify factors influencing timely CCS uptake. First, to ensure our sample aligned with previous screening findings, we examined the effect of migrant-background on CCS uptake, adjusting for age, household composition, region, survey year, self-rated health, and number of

Table 1 Descriptive statistics [n(%); M(SD)] of sample characteristics including missing data

	Full Sample	**Pap Smear in the last 3 years**		
	***N* = 6,290**[1]	**No, *n* = 1,447**[1]	**Yes, *n* = 3,741**[1]	**p-value**[2]
Pap smear in the last 3 years				
No	1,447 (23.0%)			
Yes	3,741 (59.5%)			
Missing	1,102 (17.5%)			
Sociodemographic characteristics				
Migrant-background				< 0.001
First Gen Euro long-term	471 (7.5%)	110 (7.6%)	267 (7.1%)	
First Gen Euro recent	247 (4.0%)	51 (3.5%)	121 (3.2%)	
First Gen Non-Euro long-term	657 (10.7%)	169 (11.7%)	298 (8.0%)	
First Gen Non-Euro recent	318 (5.1%)	99 (6.8%)	104 (2.8%)	
Second Gen Euro descendant	459 (7.3%)	89 (6.2%)	314 (8.4%)	
Second Gen Non-Euro descendant	225 (3.6%)	53 (3.7%)	112 (3.0%)	
Native	3,870 (62.2%)	859 (59.4%)	2,513 (67.2%)	
Missing	43 (0.8%)	17 (1.2%)	12 (0.3%)	
Age (continuous in years)	44.9 (11.2)	46.8 (11.8)	44.5 (10.8)	< 0.001
Missing	*0*	*0*	*0*	
Age (categorical)				< 0.001
50 and over	2,414 (38.4%)	684 (47.3%)	1362 (36.4%)	
Younger than 50	3,876 (61.6%)	763 (52.7%)	2379 (63.6%)	
Missing	0	0	0	
Household composition				< 0.001
Single	996 (16.1%)	310 (21.4%)	582 (15.6%)	
Single parent with child(ren)	811 (13.1%)	181 (12.5%)	491 (13.1%)	
Couple without child(ren)	1,337 (21.3%)	380 (26.3%)	746 (19.9%)	
Couple with child(ren)	2,672 (43.1%)	464 (32.1%)	1,717 (45.9%)	
Other or unknown	474 (7.7%)	112 (7.7%)	205 (5.5%)	
Missing	0	0	0	
Region				0.073
Flemish Region	2,154 (34.2%)	563 (38.9%)	1,378 (36.8%)	
Brussels-Capital Region	1,837 (29.2%)	391 (27.0%)	961 (25.7%)	
Walloon Region	2,299 (37.0%)	493 (34.1%)	1,402 (37.5%)	
Missing	0	0	0	
Survey Year				0.3
2013	3,047 (47.7%)	587 (40.6%)	1,583 (42.3%)	
2018	3,243 (50.3%)	860 (59.4%)	2,158 (57.7%)	
Missing	0	0	0	
Socioeconomic Characteristics				
Education Level				< 0.001
Higher	2810.0 (44.7%)	452 (31.2%)	1958 (52.3%)	
Higher Secondary	1897.0 (30.2%)	540 (37.3%)	1059 (28.3%)	
Lower Secondary or No Education	1340.0 (21.3%)	392 (27.1%)	596 (15.9%)	
Missing	243.0 (3.9%)	63 (4.2%)	128 (3.3%)	
Income				< 0.001
Quintile 5 (Richest)	1312.0 (20.9%)	228 (15.8%)	930 (24.9%)	
Quintile 4	1129.0 (17.9%)	225 (15.5%)	791 (21.1%)	
Quintile 3	1047.0 (16.6%)	252 (17.4%)	639 (17.1%)	
Quintile 2	838.0 (13.3%)	250 (17.3%)	443 (11.8%)	
Quintile 1 (Poorest)	1256.0 (20.0%)	360 (24.9%)	581 (15.5%)	
Missing	708.0 (11.3%)	132 (8.4%)	357 (8.7%)	
Health indicators				< 0.001
Self-Rated health				
Very Good	1323.0 (21.0%)	307.0 (21.2%)	991.0 (26.5%)	

Table 1 (continued)

	Full Sample	Pap Smear in the last 3 years		
	***N* = 6,290**[1]	**No, *n* = 1,447**[1]	**Yes, *n* = 3,741**[1]	**p-value**[2]
Good	2587.0 (41.1%)	632.0 (43.7%)	1886.0 (50.4%)	
Fair	833.0 (13.2%)	277.0 (19.1%)	517.0 (13.8%)	
Bad	251.0 (4.0%)	97.0 (6.7%)	147.0 (3.9%)	
Very Bad	49.0 (0.8%)	16.0 (1.1%)	26.0 (0.7%)	
Missing	1247.0 (19.8%)	118.0 (7.5%)	174.0 (4.4%)	
Number of chronic conditions				< 0.001
None	4157.0 (66.1%)	838 (57.9%)	2519 (67.3%)	
1	1420.0 (22.6%)	385 (26.6%)	849 (22.7%)	
2	511.0 (8.1%)	152 (10.5%)	288 (7.7%)	
3 or more	196.0 (3.1%)	71 (4.9%)	83 (2.2%)	
Missing	6.0 (0.1%)	1 (< 0.1%)	2 (0.1%)	
Primary Preventive Behaviour				
Adequate daily fruit intake				< 0.001
No	2,472 (39%)	637 (44.0%)	1414 (37.8%)	
Yes	3,816 (61%)	810 (56.0%)	2327 (62.2%)	
Missing	2 (< 0.1%)	0	0	
Adequate daily vegetable intake				< 0.001
No	1,313 (21%)	360 (24.9%)	710 (19.0%)	
Yes	4,976 (79%)	1087 (75.1%)	3031 (81.0%)	
Missing	0	0	0	
Physical activity				< 0.001
Sedentary Activities	1340.0 (21.3%)	443 (30.6%)	854 (22.8%)	
<4 h / light activities	2655.0 (42.2%)	606 (41.9%)	2004 (53.6%)	
>4 h / light activities	508.0 (8.1%)	91 (6.3%)	407 (10.9%)	
Missing	1787.0 (28.4%)	307 (17.5%)	476 (11.3%)	
Secondary Preventive Healthcare				
Blood Pressure				< 0.001
No	348 (5.5%)	117 (8.1%)	131 (3.5%)	
Yes	5,939 (94%)	1330 (91.9%)	3610 (96.5%)	
Missing	3 (< 0.1%)	0	0	
Blood Sugar Screening				< 0.001
No	1536.0 (24.4%)	421 (29.1%)	813 (21.7%)	
Yes	4714.0 (74.9%)	1020 (70.5%)	2902 (77.6%)	
Missing	40.0 (0.6%)	6 (18.0%)	26 (72.0%)	
Blood cholesterol check				< 0.001
No	1232.0 (19.6%)	326 (22.5%)	665 (17.8%)	
Yes	5022.0 (79.8%)	1,112 (76.8%)	3,058 (81.7%)	
Missing	36.0 (0.6%)	9 (0.6%)	18 (0.5%)	
Healthcare Professional Interaction				
GP visit				< 0.001
Never	62 (1.0%)	25 (1.7%)	17 (0.5%)	
>12 Months	1,095 (17%)	272 (18.8%)	562 (15.0%)	
≤12 Months	5,133 (82%)	1,150 (79.5%)	3,162 (84.5%)	
Missing	0	0	0	
Specialist consultation				< 0.001
No	2279.0 (36.2%)	677 (46.8%)	1,064 (28.4%)	
Yes	4009.0 (63.7%)	770 (53.2%)	2,677 (71.6%)	
Missing	2.0 (< 0.1%)	0	0	
Dentist visit				< 0.001
No	1,948 (31%)	575 (37.7%)	950 (62.3%)	

Table 1 (continued)

	Full Sample	Pap Smear in the last 3 years		
	N **= 6,290**[1]	**No, *n* = 1,447**[1]	**Yes, *n* = 3,741**[1]	**p-value**[2]
Yes	4,340 (69%)	872 (23.8%)	2,791 (76.2%)	
Missing	0	0	0	

[1] n (%);Mean (SD)

[2] Pearson's Chi-squared test

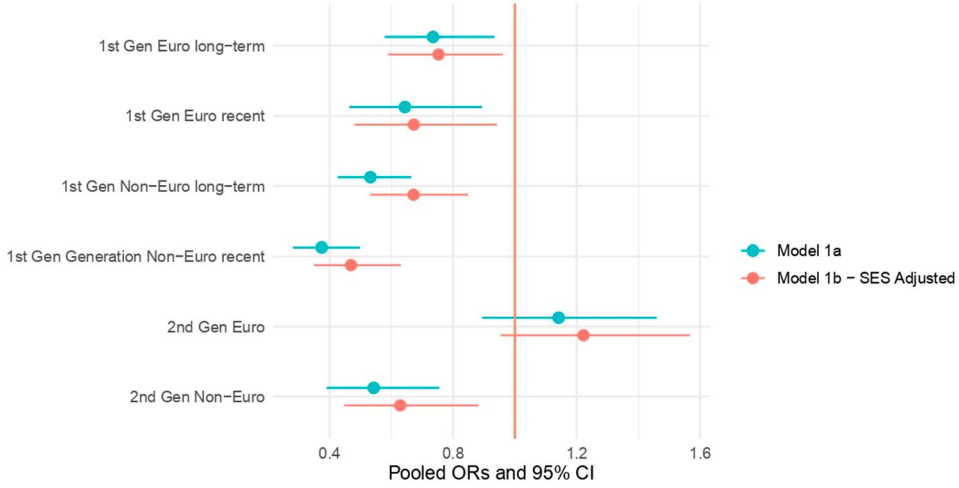

Fig. 1 Pooled odds ratios and 95% confidence intervals for association between migrant-background and cervical cancer screening uptake. Model 1a is adjusted for age, age-squared, household composition, region, survey year, self-rated health and number of chronic conditions. Model 1b: adjusted for age, age-squared, household composition, region, survey year, self-rated health, number of chronic conditions, income and education

chronic conditions, then introduced income and education to determine if SES explained migrant-background disparities (Research Objective 1). Second, we assessed the association between the three CHC dimensions—primary prevention, secondary prevention, and healthcare provider interactions—and CCS uptake (Research Objective 2). We also evaluated CHC accumulation disparities among migrant-origin groups (Research Objective 3). To account for age-related differences in screening recommendations, we repeated the CHC accumulation analysis by age strata. Due to sample size constraints among second-generation individuals over 50[2], these stratified analyses focused on first-generation migrants. Finally, we examined the extent to which CHC explained persistent screening disparities by migrant-background, allowing for differential CHC-CCS correlations across groups. Interaction terms between CHC and immigrant-background were introduced, and predicted probabilities of CCS uptake were plotted by migrant-background at varying CHC levels. All models were checked for multicollinearity, and final estimates were obtained using Rubin's rules to pool the imputed datasets [53]. Analyses were conducted using RStudio software (R version 4.2.2).

[2] As of Age 50, women in Belgium are assessed for their risk profile for cardiovascular disease and diabetes.

Results

Descriptive statistics by pap smear uptake

An overview of the general characteristics of the study sample before imputation and across the two included survey waves is presented in Table 1, including prevalence estimates for sociodemographic, socioeconomic and CHC indicators. Our sample consists of 6,290 women ($n_{2013} = 3{,}047$, $n_{2018} = 3{,}243$), with a mean age of 44.9 years ($SD = 11.2$). A greater proportion of screening was observed among non-migrant native Belgian women, those under the age of 50, women with children, higher-educated and higher-income women, as well as women who rated their health positively and those without chronic conditions. Women engaging in primary preventive behaviour, secondary preventive healthcare, and those attending appointments with healthcare professionals also reported slightly elevated proportions of screening. No significant differences in reported screening were observed by survey year or by region. Missing responses ranged from 28.41% for the measure of physical activity to less than 0.01% for attendance at a GP appointment in the last year.

Migrant-background disparities in CCS uptake

We observed a significant association between immigrant origin and timely pap smear uptake (Fig. 1). In the baseline model (Model 1a; adjusted for age, household

composition, Region, survey year, and health indicators) compared to native-born women, all immigrant-background groups had lower odds of timely pap smear uptake, with the most pronounced effects observed among recent first-generation non-European immigrants (OR = 0.374, $p < 0.001$) and long-term first-generation non-European immigrants (OR = 0.532, $p < 0.001$). The disparities between those of non-European origin and natives was larger than that for those of European origin. Specifically, recent and long-term first-generation European immigrants were 0.644 ($p < 0.01$) and 0.735 times as likely ($p < 0.05$) as natives to have been screened, respectively, while their non-European counterparts had much lower odds. A further sensitivity analysis was carried out to test different cut-offs for short-term and long-term first generation immigrants, with similar trends observed (Supplementary Fig. 1). Among the second generation, those of non-Europeans origin were less likely compared to natives to have had a pap smear (OR = 0.543, $p < 0.001$), whereas second-generations of European origin present an interesting exception, as they display the smallest and non-significant disparities compared to the majority population (OR = 1.142, $p = 0.671$). When adjusting for income and education level (Model 1b), the disparities in screening uptake by migrant background only slightly decreased, mainly for non-European origin groups. The full model results, including controls, are available in Table S1 in the supplementary file.

Table 2 Pooled odds ratios & 95% CIs for cervical Cancer screening uptake by levels of cultural health capital: comparison of baseline and SES-Adjusted models

	Baseline Model [95% CI]	SES-Adjusted Model [95% CI]
Primary Prevention CHC		
Low -level CHC	ref	ref
High-level CHC	1.858***	1.624***
	[1.628, 2.121]	[1.416, 1.864]
Secondary Prevention CHC		
Low-level CHC	ref	ref
High-level CHC	1.511***	1.449***
	[1.313, 1.739]	[1.256, 1.673]
Healthcare Engagement CHC		
Low-Level CHC	ref	ref
High-Level CHC	2.151***	1.963***
	[1.850, 2.501]	[1.681, 2.292]
Num.Obs.	6247	6247
Num.Imp.	30	30

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. **Baseline Model**: adjusted for age, household composition, region, survey year, health-related self-rated health and number of chronic conditions. **SES-Adjusted Model**: adjusted for age, household composition, region, survey year, self-rated health, number of chronic conditions, income and education

Association between CHC and CCS

Results indicate significant associations between all three dimensions of CHC and CCS uptake, with higher CHC scores corresponding to greater odds of timely screening (Table 2). Women with high-level primary prevention CHC had significantly higher odds of having undergone CCS within the past three years (OR = 1.858 $p < 0.001$). Even after adjusting for SES, this association remained (OR = 1.624, $p < 0.01$). Similarly, women with above-median CHC scores in secondary prevention engagement showed increased odds of screening uptake (OR = 1.511, $p < 0.001$). After SES adjustment, the association also remained significant (OR = 1.449, $p < 0.001$). The CHC dimension of healthcare engagement also showed a strong positive association with CCS uptake (OR = 2.151 $p < 0.001$).

Migrant-background disparities in cultural health capital

We observe evidence of disparities in CHC across different migrant origin groups, with variations across the three dimensions of CHC. For the primary preventive health behaviour CHC scale (See Fig. 2), first-generation non-European migrants, particularly recent arrivals, exhibited notably lower odds of having high CHC related to primary prevention compared to the native majority (OR = 0.333, $p < 0.001$). Even after adjusting for income and education, their odds remained significantly lower (OR = 0.471 $p < 0.05$). Long-term first-generation migrants, both European (OR = 0.716, $p < 0.01$) and Non-Europeans (OR = 0.441, $p < 0.001$), and second generations of non-European origin (OR = 0.511, $p < 0.001$) also had lower odds compared to natives. Adjusting for age and income did not explain these disparities. Second generation Europeans exhibited the smallest disparities compared to natives (OR = 0.863) however results were not statistically significant.

No significant disparities were observed in secondary prevention CHC accumulation in the age-stratified analysis of first-generation migrants in our sample. The odds of having accumulated secondary prevention related CHC were not significantly different for first-generation non-European migrants compared to the majority population, both among individuals under 50 years old (OR = 1.156, $p > 0.1$ in SES-adjusted model) and those 50 and older (OR = 1.175, $p > 0.1$ in SES-adjusted model). Similar trends were observed among first-generation Europeans (Fig. 3).

Figure 4 describes differences in engagement with healthcare providers, by migrant-background. First-generation non-European migrants had significantly lower odds of accumulating high levels of CHC related to healthcare provider engagement, compared to natives, both among recent (OR = 0.414, $p < 0.001$) and long-term non-European migrants (OR = 0.690, $p < 0.001$).

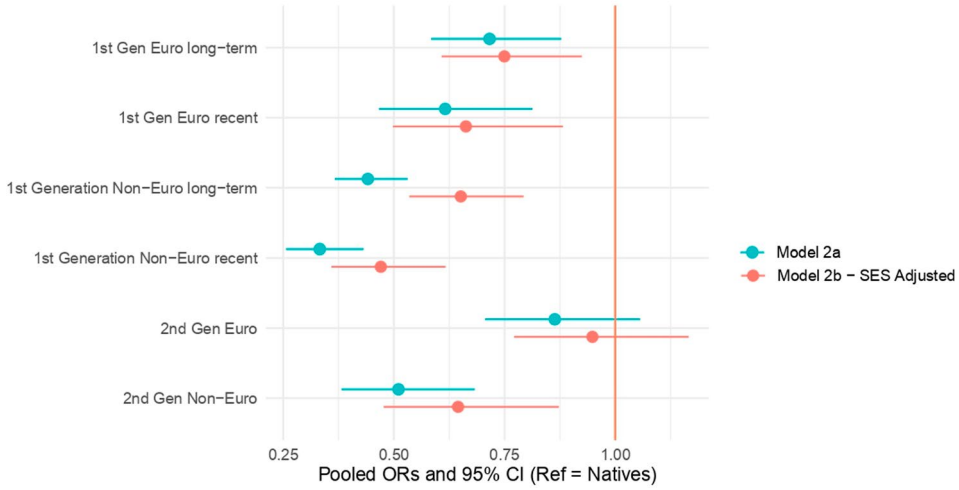

Fig. 2 Primary prevention CHC. Pooled Odds ratios and 95% CIs using imputed data ($N = 6{,}247$) for association between migrant-background and accumulation of primary prevention CHC. Model 2a is, adjusted for age, age-squared household composition, survey year, Region, self-rated health & number of chronic conditions. Model 2a - SES Adjusted model is adjusted for age, age-squared, household composition, survey year, Region, self-rated health, number of chronic conditions, income and education

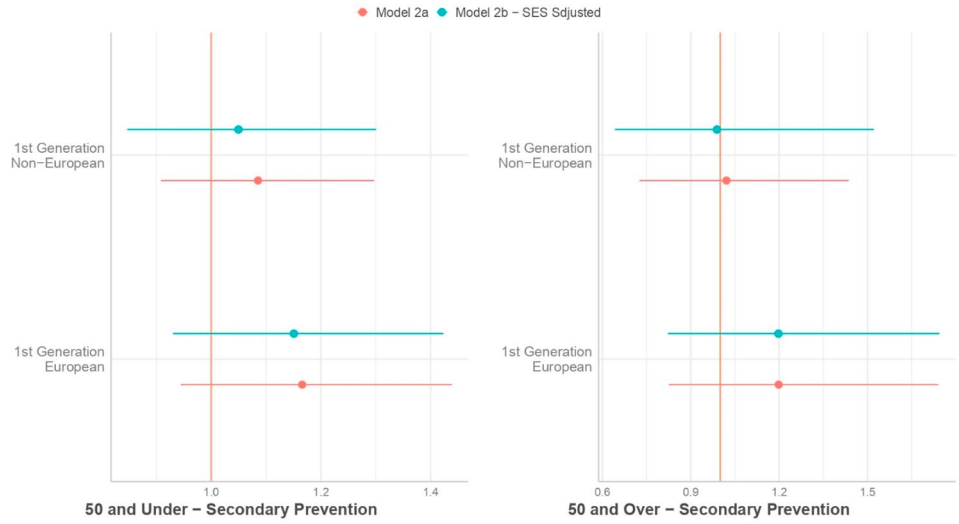

Fig. 3 Pooled odds ratios and 95% confidence intervals using imputed data for associations between migrant background and accumulation of secondary prevention CHC in women aged under 50 ($n = 3{,}389$), and 50 and over ($n = 2{,}197$ **Model 2a** is adjusted for age, household composition, survey year, Region, self-rated health and number of chronic conditions. **Model 2b- SES adjusted models** are adjusted for age, household composition, survey year, Region, self-rated health, number of chronic conditions, income and education

In the case of long-term migrants, however, adjusting for education and income explained these disparities. Similar trends were observed among recent European (OR = 0.710, $p < 0.05$) and long-term migrants (OR = 0.778, $p < 0.05$), with these disparities being marginally explained when adjusting for socioeconomic characteristics. Whereas no significant disparities were observed in second generations with non-European backgrounds, second generations of European origin were significantly more likely to have engaged with healthcare providers (OR = 1.385, $p < 0.05$), with odds slightly increasing when adjusting for socioeconomic characteristics (OR = 1.492, $p < 0.01$).

Migrant-background disparities in screening, adjusted for dimensions of CHC

Controlling for various dimensions of CHC had a limited effect on the association between migrant-background and timely pap smear uptake (Fig. 5). After adjusting for engagement in primary preventive behaviours alongside income and employment, the odds of screening for first-generation recent non-European migrants increased slightly from 0.469 ($p < 0.001$) to 0.502 ($p < 0.001$).

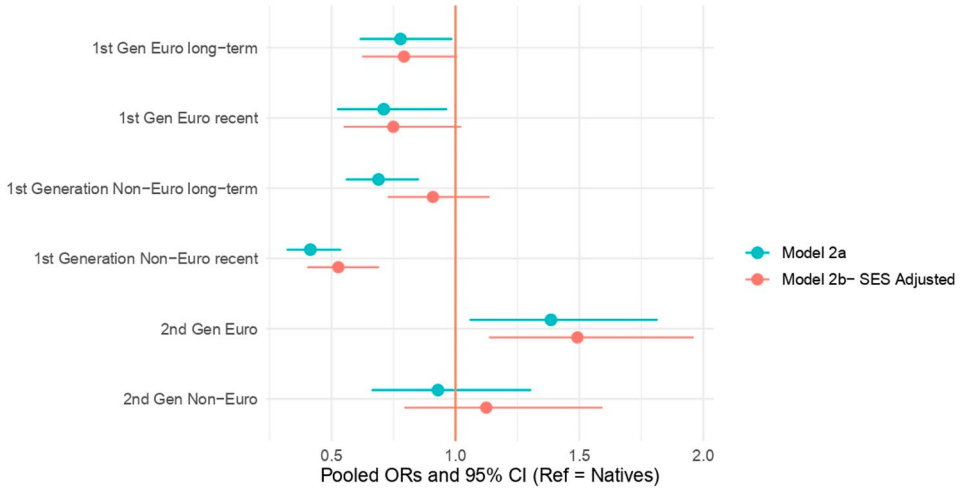

Fig. 4 Healthcare Provider Engagement CHC. Pooled Odds ratios and 95% confidence intervals using imputed data ($N = 6{,}247$) for association between migrant-background and accumulation of healthcare provider engagement related CHC. Model 2a is, adjusted for age, age-squared, household composition, survey year, Region, self-rated health & number of chronic conditions. Model 2a - SES adjusted model is adjusted for age, age-squared, household composition, survey year, Region, self-rated health, number of chronic conditions, income and education

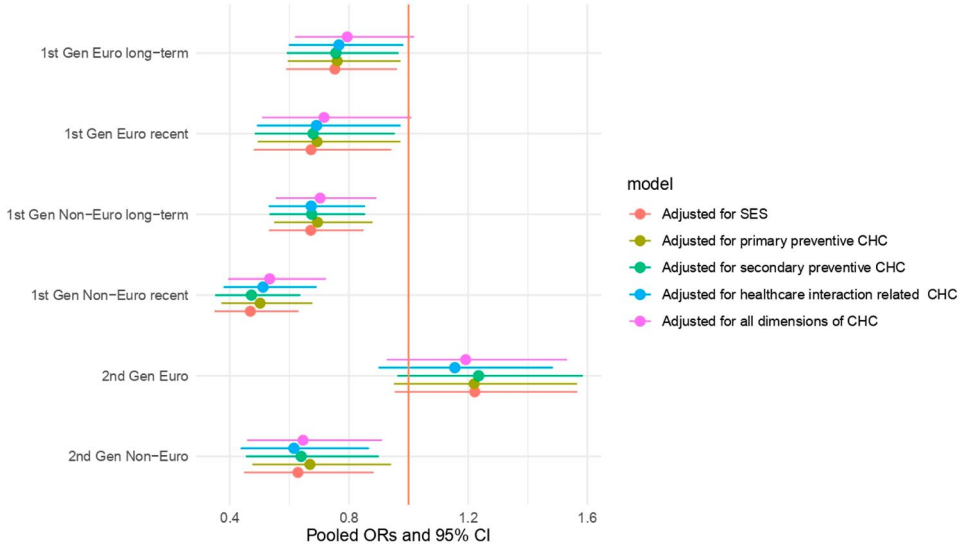

Fig. 5 Pooled Odds ratios and 95% confidence intervals using imputed data ($N = 6{,}247$) for association between migrant-background and pap smear uptake, adjusted for three dimensions of CHC separately, and combined. All models are adjusted for age, age-squared, household composition, survey year, Region, self-rated health, number of chronic conditions, income and education

However, this minimal change suggests that primary preventive behaviours do not substantially account for the observed disparities. Similarly, adjusting for secondary prevention did little to explain the disparities in screening uptake for this group (OR = 0.473, $p < 0.001$). Adjustment for healthcare interaction produced a small improvement in the odds ratio (OR = 0.512, $p < 0.001$), but this change remained minor. Even after simultaneously controlling for all CHC dimensions, there was no significant reduction in disparities for most groups. The only exception was observed among first-generation European migrants, where disparities were marginally no longer statistically significant (OR = 0.716, $p < 0.1$ for recent migrants and OR = 0.794, $p < 0.1$ for long-term migrants). These findings suggest that while CHC factors contribute to cervical cancer screening uptake, they do not sufficiently account for migrant-background populations.

Interaction effects between CHC and migrant-background

The predicted probabilities plotted in Fig. 6 highlight key patterns in the interaction between CHC and migrant-background with respect to timely pap smear uptake. Overall, as primary prevention CHC scores increase, the likelihood of timely pap smear screening rises across all

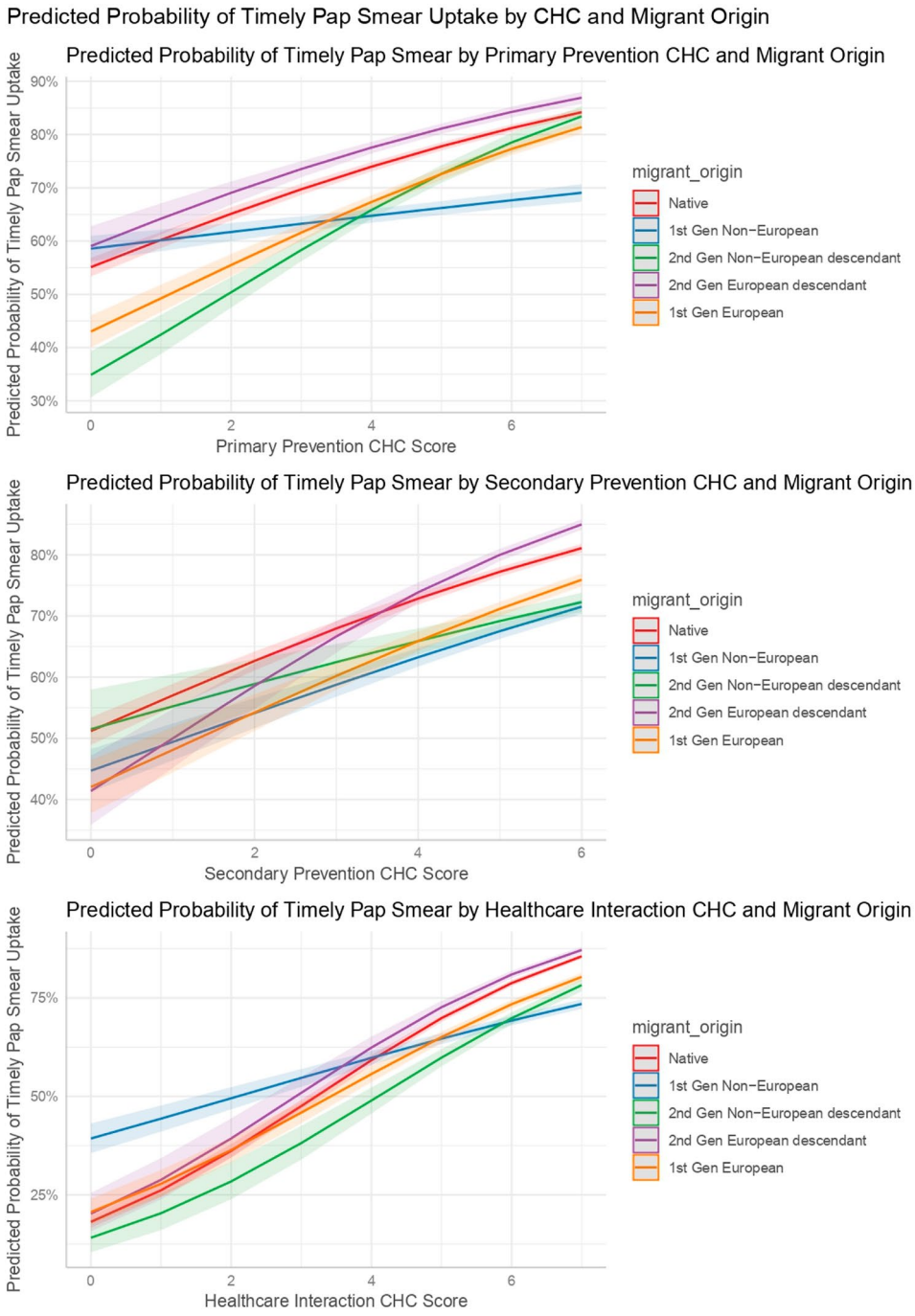

Fig. 6 Predicted probabilities of timely pap smear uptake by CHC and migrant origin

groups. However, the strength of this relationship varies by migrant-background, particularly for first-generation non-European migrants, where the association is notably weaker compared to other groups. While most groups converge at higher CHC levels—with predicted probabilities reaching 83–87%—first-generation non-European migrants remain an exception, achieving only about 67% even at the highest CHC levels. This indicates that migrant-background differences in screening uptake are particularly pronounced among individuals with lower levels of CHC but diminish as CHC increases. Due to small sample sizes and to enhance the readability of results, recent and long-term first-generation immigrants were grouped together in this analysis.

The predicted probabilities for timely pap smear uptake across different levels of secondary prevention CHC show a consistent increase for all groups, ranging from approximately 45–65% at lower CHC levels and 67–85%

at higher CHC levels. The parallel slopes across groups indicate that secondary prevention CHC is positively and similarly associated with CCS uptake, with little evidence of interaction effects by migrant-background. For healthcare engagement CHC, predicted probabilities also increase consistently across all groups, with second-generation European descendants experiencing slightly stronger associations compared to others. Probabilities start from around 32% for second-generation non-Europeans and 58% for second-generation Europeans at lower CHC levels, rising to 66% and 84%, respectively, at higher CHC levels. However, the association between healthcare engagement CHC and CCS uptake is again weaker among first-generation non-European migrants, suggesting they benefit less from improvements in this dimension of CHC.

Discussion

The aim of this study was to examine the role of cultural health capital (CHC) in shaping disparities in cervical cancer screening (CCS) uptake across migrant-background groups, thereby extending the limited research on how health-related cultural capital influences healthcare inequalities. While the relationship between socioeconomic status (SES) and CCS uptake is well established [23, 50] and CHC has been considered as a mechanism producing social inequalities [5], we deepen this understanding by focusing on disparities between immigrants, their descendants, and the Belgian majority. Specifically, we hypothesised that immigrants would have lower levels of host country–relevant CHC than the native majority (Hypothesis 1), with differences by origin (Hypothesis 1a) and length of residence (Hypothesis 1b). We further anticipated that second-generation individuals might display distinct CHC patterns due to greater exposure to mainstream medical practices (Hypothesis 1c), and that although CHC would be associated with CCS uptake generally (Hypothesis 2), this relationship would be more complex for migrants and racialised second generation descendants, due to them facing additional barriers (Hypothesis 3).

Our findings align with European research indicating significant CCS disparities among first-generation non-European immigrants [54]. These inequalities persist after controlling for SES, suggesting that migrant and ethnic minority groups confront more than economic or educational disadvantages. This is particularly relevant in Belgium, where although cervical cancer screening is reimbursed if conducted at recommended intervals, women still incur a copayment for consultations. Additionally, the screening programme remains largely opportunistic outside of the Flemish region, which may disproportionately affect migrant women who are less familiar with navigating the healthcare system or lack access to trusted primary care providers. We also find that longer residence is associated with smaller screening disparities, consistent with studies showing that greater time in the host country can increase familiarity with healthcare systems and improve access to health-related information [55].

Our analysis further expands upon this literature by examining second-generation descendants, both of European and Non-European descent. We show that, although their CCS rates differ from those of the first generation, second-generation individuals of non-European origin still experience disparities compared to the native majority, while those of European origin do not. Based on the demographics of the Belgian population, second-generations of non-European origin mainly consist of individuals with Turkish and North and Sub-Saharan African heritage, and can therefore be considered to represent a racialised or ethnicised group. Those of "European" origin, on the other hand, are mostly descendants of migrants from countries within the European Union, and thus in a Belgian context, can be considered part of the non-racialised majority [43]. These results highlight the complex interplay of migrant-background, racialisation processes, and generation, emphasizing the need to acknowledge the diversity within migrant and ethnic minority populations when addressing CCS disparities.

In line with previous literature, we find that CHC is strongly associated with CCS uptake. Across primary prevention, secondary prevention, and healthcare interaction dimensions, higher CHC scores consistently correlate with greater odds of timely CCS. This relationship remains robust even after adjusting for SES, indicating that CHC influences screening behaviour independently.

A key insight and original contribution of our analysis is the significant variation in CHC accumulation by origin, years lived in Belgium and generation. While secondary prevention CHC shows greater convergence, pronounced disparities appear in primary prevention and healthcare engagement CHC. Previous research shows that immigrants often struggle to transfer cultural capital across borders, as skills, qualifications, and norms from their origin countries may be undervalued in host societies [56]. Our findings extend this concept to healthcare, revealing that disparities in CHC, an essential resource for navigating healthcare systems, also vary substantially by migrant-background. This supports Erel's (2010) [26] argument that cultural capital adapts as it is reproduced in new contexts and may explain why non-European migrants, particularly recent arrivals, exhibit lower CHC. CHC accumulation is thus path-dependent, shaped by cumulative life experiences and structural conditions. Early exposure to supportive healthcare environments, educational opportunities, and resources to build health literacy all contribute to CHC accumulation, whereas

systemic discrimination or limited healthcare access constrain its development. These dynamics, persisting even after SES adjustment, emphasisze the need to consider cultural and social factors when examining health behaviours and outcomes among different origin groups.

Although CHC is strongly associated with CCS uptake, and migrants and non-European second-generation descendants display lower primary prevention and healthcare engagement CHC than the native majority, adjusting for CHC does not reduce screening participation disparities. Yet, our findings also show that for most immigrant-origin groups, CHC accumulation is positively correlated with CCS to a similar degree as for the natives. This suggests that enabling processes of CHC accumulation in general may also lead, over time, to increased CCS participation. Thus, while CHC accumulation may not play a role in reducing migrant-related and ethnic *inequities* in CCS uptake, our findings do highlight it as a robust correlate in CCS participation independently of origin.

A notable exception to this trend is represented by first-generation non-European migrants. For this group, the correlation between primary preventive and healthcare engagement CHC, on the one hand, and CCS participation, on the other, is significantly weaker than for natives or other migrant and ethnic minority groups. We propose two interpretations. First, primary preventive CHC as operationalized here (i.e. diet and exercise) may emphasise Western notions of prevention that do not universally align with health-promoting practices in non-European contexts [57, 58]. The survey's CHC measures may privilege Western norms, overlooking alternative, culturally grounded preventive practices. These findings highlight the need for more inclusive measurement tools that reflect diverse health practices, ensuring more accurate assessments in multicultural populations.

Second, the lower association between healthcare engagement CHC and CCS among first generation non-European migrants may be due to underlying systemic mechanisms that limit the accumulation and translation of CHC into health behaviours for this group specifically. For instance, research has shown that discrimination or bias in healthcare settings can undermine trust and deter individuals from accessing preventive care [31, 59]. These dynamics are compounded in Belgium by structural access barriers as cervical screening requires proactive scheduling, and women must pay a consultation fee that varies depending on whether they visit a general practitioner or a specialist. Migrant women, especially recent arrivals, may face compounded barriers if they are unaware of these costs, do not speak the language, are not invited to screening systematically, or lack established care relationships with GPs. Consistent with this literature, our findings suggest that it may be the presence of structural barriers and discrimination – mainly concerning first-generation non-European immigrants - that impacts the accumulation of CHC on one hand and its translation into to CCS participation on the other.

Overall, our results suggest that CHC offers a valuable framework for understanding migrant and ethnic disparities in the *accumulation* of health-related resources, and, to an extent, the *returns* to these resources with respect to uptake of CCS. Yet, at the same time, these differentials in the levels and functioning of CHC do not significantly explain migrant and ethnic inequalities in CCS. While enhancing CHC could help address CCS inequalities, its impact will likely vary by group. For non-European migrants, CHC improvements may have limited influence on screening participation, whereas for others, such as non-European second-generation descendants, who do not additionally experience the challenges of migration-related barriers, and European-background first-generation migrants, who do not experience the challenges of racialised discrimination, enhancing CHC could be more beneficial.

Strengths and limitations

This study emphasizes the importance of situating ethnic inequalities in cervical cancer screening within a broader framework of Cultural Health Capital accumulation among diverse migrant-background groups. By operationalising CHC through health-promoting behaviours and healthcare engagement, it moves beyond narrow measures of health literacy to account for key factors such as migrant generation, region of origin, and duration of settlement. These factors prove consequential, particularly for first-generation non-European immigrants, who face significant constraints in translating their accumulated CHC into higher CCS participation. These results highlight the need to move beyond one-size-fits-all healthcare strategies. Interventions aimed at increasing CHC should be paired with targeted measures for racialised minorities, including policies that reduce discrimination, better language support services, and culturally competent care. From a health policy perspective, our findings underscore the value of investing in CHC interventions, such as community-based healthy eating programs and support for routine GP attendance, to bolster preventive behaviours like cancer screening among women of all ethnic backgrounds. However, because first-generation non-European women derive somewhat less benefit from CHC, these initiatives should be paired with culturally tailored strategies, outreach through trusted community networks and training for healthcare providers in culturally sensitive care, to effectively overcome barriers.

Several limitations to this study should also be noted. While the BHIS is nationally representative, its reliance on the official population register excludes undocumented individuals, asylum seekers, and other vulnerable groups, potentially underestimating disparities. Using respondents' and their parents' regions of birth as proxies, furthermore, cannot fully capture the complexities of racialisation, ethnic identities, and discrimination. Nonetheless, the analysis of second-generation populations and inclusion of time since arrival provides a more nuanced understanding of migrant-related and ethnicity-related health disparities than most prior European studies. Investing in data collection that quantifies ethnicised and racialised identities could however better enhance understanding of health inequalities and inform policies to address them.

The operationalisation of CHC presents further challenges, as it may not fully reflect culturally specific health-promoting behaviours or healthcare practices. For instance, primary prevention measures may vary significantly across communities, as shown in research on the Congolese diaspora in Belgium [57]. Similarly, practices like seeking care in countries of origin may be overlooked, underestimating CHC accumulation. Additionally, while our conceptualisation of CHC as a set of health-promoting resources acknowledges the structural embedding of capital accumulation processes, our operationalisation remains focused on individual-level behaviours and practices. As such, although we capture disparities in health-related resources that are shaped by broader social hierarchies, we are less able to measure structural barriers that may inhibit the translation of these resources into cancer screening. Finally, the secondary prevention CHC measure, focused on cardiovascular and diabetes screenings, is restrictive, as these are typically recommended from age 50 onward, potentially underrepresenting younger populations or, conversely, capturing over-screening in populations.

Conclusion

Our results emphasise the importance of considering intersecting factors such as racialisation and length of residence in shaping CHC accumulation. While CHC correlates positively with CCS uptake for most groups, it does not fully explain the observed disparities, indicating the influence of systemic barriers. Future research should refine CHC measurement tools to better reflect cultural, linguistic, and educational differences within immigrant populations and account for complex migration histories. It should also investigate the structural and systemic barriers limiting CHC accumulation, such as institutional discrimination and linguistic or cultural obstacles within healthcare systems. Longitudinal studies would especially be valuable for examining how CHC evolves over time, interacts with socioeconomic factors and discrimination, and shapes subsequent health behaviours across migrant-background and ethnic minority groups.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12889-025-23267-1.

Supplementary Material 1

Author contributions

S.D. wrote the main manuscript text, conducted the analysis, and prepared all tables and figures. S.T. contributed to the writing and editing of the manuscript, supervised the analyses, and was responsible for the paper's original conceptualisation. K.V.T. guided the analytical approach and, both K.V.T. & S.W. contributed valuable feedback to the manuscript text. All authors reviewed the manuscript.

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Data availability

The data that support the findings of this study are available from Sciensano but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of Sciensano. https://www.sciensano.be/en/projects/health-interview-survey.

Declarations

Ethics approval and consent to participate

The original data used in this study were collected through the Belgian Health Interview Survey (BHIS), conducted by Sciensano (the Belgian Institute of Public Health). The sampling and survey methods were carried out in accordance with Belgian privacy legislation and approved by the Human Ethics Committee of Ghent University Hospital (EC UZG). Written informed consent was obtained from all participants at the time of the BHIS data collection. The use and analysis of these fully anonymised data for the present study were further approved by the Human Ethics Committee of Ghent University Hospital (EC UZG Ref No: PA-2023-0001).

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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