

Health selection into migration from Poland to the Netherlands: a matched case–control analysis

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ABSTRACT

This study sheds light on health selection into migration from Poland to the Netherlands. Scholars have highlighted health as an important resource to overcome barriers to migration, and suggested that health selection into migration may particularly be expected under specific conditions, e.g. when geographical distances between origin and destination countries are large and when immigration policies in the destination country are restrictive. I assessed whether health selection into migration was also present in a within–European Union migration flow to which such conditions do not apply. I analyzed data from four surveys of Polish migrants in the Netherlands ($n = 1,210$) and European Social Survey data on Polish natives who stayed in Poland ($n = 1,843$). I performed conditional logistic regression analyses for matched case–control groups to model health selection into migration. Better health status was associated with a greater propensity to migrate from Poland to the Netherlands. Additional research is needed to determine whether the lower expected returns on migration for people in suboptimal health make them less inclined to migrate than their healthier counterparts, also in the absence of restrictive immigration policies and excessive geographical distances between origin and destination countries.



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Introduction

The current study aims to shed light on health selection into migration from Poland to the Netherlands. Like many other Western-European

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countries (OECD 2012), the Netherlands has seen a marked increase in the number of migrants from Central and Eastern-European (CEE) countries following the 2004 expansion of the European Union (EU). People of Polish origin form the largest group of CEE migrants in the Netherlands, with registers reflecting an increase from approximately 21,000 in 2004 to more than 170,000 in 2023 (Statistics Netherlands 2023). With the withdrawal of the United Kingdom from the EU, the Netherlands became the EU country with the second largest number of Polish migrants, after Germany (International Centre for Migration Policy Development 2023). Most Polish migrants to the Netherlands came for work or family reunification (Gijsberts *et al.* 2018; Luthra *et al.* 2018).

International migration is known to be selective, based in part on the possession of the resources needed to address the challenges that come with migration (Lee 1966; Feliciano 2020). For instance, post-2004 emigration from Poland has been more common among highly educated than among less-educated people (Anacka and Okólski 2010; Dustmann *et al.* 2015). Health is another potentially important resource facilitating emigration (Feliciano 2020), but whether migration from Poland and other CEE countries is health selective has not been rigorously assessed. This research gap is unfortunate, as scholars have argued that health selection in international migration can be expected when major challenges (e.g. large geographical distances, restrictive immigration policies in the destination country) must be overcome (Feliciano 2020). Given the Netherlands' relative geographic proximity to Poland (cf. Engbersen *et al.* 2013) and the right to move and reside freely within the EU that Polish people enjoy as EU citizens (cf. Gerhards 2008), the barriers to migration from Poland to the Netherlands may be considered to be modest. In the current study, I assessed whether health selection exists in this context, to expand the literature on health and migration.

I focused on the migration flow to the Netherlands not only because the country is an important and relatively proximate EU destination for Polish migrants, but also because samples of migrants can be drawn from the national population register (Salentin and Schmeets 2017). Such sampling is not possible in other European countries with large Polish migrant communities, such as Germany, Ireland, and the United Kingdom (Luthra *et al.* 2016; Salentin and Schmeets 2017), and it has enabled the fielding of several population-based migrant surveys in the Netherlands. In this study, I used data from four such surveys of Polish migrants in the Netherlands in combination with European Social Survey data on Polish natives who stayed in Poland. I performed

conditional logistic regression analyses for matched case–control groups to account for (combinations of) key sociodemographic background characteristics that may both shape health and predispose people toward emigration.

Background

The healthy migrant effect

Upon arrival in many high-income destination countries, migrants tend to have better health than do natives with no migration background (Biddle *et al.* 2007; Lu *et al.* 2017; Campostrini *et al.* 2019; Wallace *et al.* 2019). This phenomenon – also noted among Polish migrants in the Netherlands (Gijsberts *et al.* 2018) – has been referred to as the ‘healthy migrant effect’ (Razum *et al.* 1998) and has often been interpreted as evidence of health-based self-selection (Razum *et al.* 1998). Health selection into migration may be expected, as the returns gained from migration may be larger for people in better health, for instance due to the physical demands of jobs available on the migrant labor market (cf. Sjaastad 1962; Jasso *et al.* 2004). International migration moreover requires that a range of obstacles be overcome, and the extent to which these obstacles constitute barriers for people to migrate is contingent on personal factors (Lee 1966). People’s ability to overcome the obstacles that come with international migration may particularly be compromised when their health is less than good, and this may make people in suboptimal health less likely to act on migration intentions (Van Dalen and Henkens 2013).

As described in the next paragraphs, several scholars have pointed out, however, that mechanisms other than health selection into migration can also result in better health of recently arrived migrants compared with natives of the receiving country. These potential alternative mechanisms need to be accounted for if one wants to assess health selection into migration.

Appropriateness of comparison group selection

A potential alternative explanation for migrants’ relatively good health upon arrival in destination countries is the overall better health status in the origin countries, for instance due to generally healthier lifestyles and diets (Blue and Fenelon 2011; Van Hook *et al.* 2018). As explained

by Feliciano (2020; cf. Kennedy *et al.* 2015), approaches centered on the comparison of migrants with people who stayed in their countries of origin are most suitable to rule out this explanation and gain insight into health selection into migration. Plausibly due to the limited availability of suitable data (Feliciano 2020), the healthy migrant effect is nevertheless often assessed by comparing migrants with natives of destination countries (Spallek *et al.* 2011). Gijsberts *et al.*'s (2018) carefully worded suggestion that Polish migrants in the Netherlands might be positively selected on good health was also based on such a comparison. The implicit assumption in these approaches is that migrants' and natives' health status would be similar in the absence of health selection. Given the substantial differences in the health of countries' native populations (Moullan and Jusot 2014), it is, however, questionable whether natives constitute a meaningful comparison group (Spallek *et al.* 2011).

There is a growing body of work in which migrants are compared with their counterparts who stayed in their countries of origin, but the bulk of this work has focused on migration to Anglo-Saxon countries. Typically, the notion that healthier people are more likely to emigrate has been supported. Morey *et al.* (2020), for instance, found that people from the Philippines who were registered for a mandatory pre-departure orientation seminar for people wishing to work in the United States had systemically fewer health conditions than did their counterparts with no intention to emigrate. Ro *et al.* (2016) found that recent migrants to the United States from 18 of 19 countries considered (excepting Mexico) had better self-reported health than did non-migrants of the same age in their countries of origin. Rubalcava *et al.* (2008) analyzed Mexican panel data and found that health at baseline significantly predicted emigration between baseline and follow-up in some demographic groups, but emphasized that substantial variation existed according to gender, the urbanization level of the region of origin, and the health indicator considered. Bostean (2013) found that Mexican migrants in the United States were less likely than non-migrants in Mexico to have functional limitations, and argued that this finding suggested that Mexicans without physical impairment were more likely to migrate. Kennedy *et al.* (2015) found that people who migrated between the United States, the United Kingdom, Australia, and Canada were less likely to have chronic conditions or poor self-assessed health than were their counterparts who stayed in their countries of origin.

The body of work on health selection in migration in Europe is rather small. Fuller-Thomson *et al.* (2015) showed that health at the age of 8 years was associated positively with emigration later in life in a cohort

born in 1946 in the United Kingdom, and Van Dalen and Henkens (2013) found that people in the Netherlands were more likely to emigrate in the 5 years that they were followed after reporting better health. Given the large migration flows from CEE countries in general and Poland in particular to Western-European countries (OECD 2012), the dearth of research on health selection into migration to Western Europe among people from Poland or other CEE countries is particularly unfortunate. It is unclear to what extent conclusions from studies on health selection into migration in other contexts also apply to post-2004 migration from Eastern to Western Europe.

Drivers of migration intention (Williams *et al.* 2018) and actual emigration (Tufiş and Sandu 2023) differ notably among countries. Moreover, Lee (1966) argued that the extent to which the obstacles associated with migration from a given country to a particular destination country deter people from migrating depends on personal characteristics. Feliciano (2020) essentially made the same point in reversed form when she stated that ‘immigrant selectivity varies by context of origin and destination’ (p. 320). Specifically, she suggested that migration is likely to be more selective when the associated obstacles are larger. Given the Netherlands’ relative geographic proximity to Poland (cf. Engbersen *et al.* 2013) and the right to move and reside freely within the EU that Polish people enjoy as EU citizens (cf. Gerhards 2008), the barriers associated with migration from Poland to the Netherlands may be relatively modest.

The proper assessment of health selection into migration from Poland to the Netherlands should involve the comparison of *recent* Polish migrants in the Netherlands with their counterparts who stayed in Poland (cf. Kennedy *et al.* 2015; Ro *et al.* 2016), as the physical and psychosocial health of migrants tends to decline rapidly with increased lengths of stay in recipient countries (Reus-Pons *et al.* 2018; Syse *et al.* 2018; Wallace *et al.* 2019; Trappolini and Giudici 2021; Holz 2022; Sesti *et al.* 2022). This pattern, which has been referred to as the ‘exhausted migrant effect’ (Bollini and Siem 1995), has also been noted among Polish migrants in the Netherlands (Van den Broek and Grundy 2017; Lubbers and Gijssberts 2019). It may contribute to the underestimation of health selection in migration when non-recent migrants are also considered. Vanthomme and Vandenheede (2021) furthermore showed that CEE migrants in the Netherlands’ neighboring country of Belgium were more likely to return to their countries of origin when their health was good or very good than when it was less than good. This finding suggests that the underestimation of health

selection into migration from Poland to the Netherlands may be exacerbated by selective return migration of healthy persons from the pool of Polish migrants in the Netherlands when migrants with longer stays in the Netherlands are included in analyses.

Confounding of health selection

Even when recent migrants are compared with their counterparts who remained in the country of origin, estimates of health selection into migration may be biased. This is because apparent health selection into emigration may be confounded. That is, factors that predispose people towards emigration – such as a higher educational attainment – may also positively influence health status (cf. Ichou and Wallace 2019). Researchers typically try to account for this potential source of bias by adjusting for a range of control variables, such as gender, age, educational attainment, and parental socioeconomic status (Rubalcava *et al.* 2008; Van Dalen and Henkens 2013; Fuller-Thomson *et al.* 2015), but they rarely consider potential interaction between these variables. This is unfortunate, because international migration is selective based on a range of personal characteristics that plausibly interact with each other (cf. Feliciano 2020). Thus, the common procedure of adjusting for multiple potential confounders separately, but not for any interaction between them, may be problematic. For instance, the magnitude of differences between higher and lower educated people in the likelihood of emigration may differ between women and men (Stecklov *et al.* 2010), and at the same time the educational gradient in health may vary by gender as well (Ross *et al.* 2012). From this example it follows that models in which migration is regressed on health should not just be adjusted for gender and educational attainment, but also for the interaction between these variables. The complex interplay among factors shaping health as well as driving migration is plausibly not limited to the interaction between gender and educational attainment, and carries a substantial risk of misspecification in models in which migration is regressed on health. Under these conditions, exact matching of recent migrants and their counterparts who remained in the country of origin on a range of key sociodemographic characteristics may be preferable, as this approach accounts for all distributional differences on the potential confounders considered, including every possible interaction between them (cf. Iacus *et al.* 2012).

Data and methods

Data

After making an inventory of the migrant survey data landscape in the Netherlands, I identified four migrant surveys suitable for the pursuit of the current study's research aims. These surveys were collected in the last decade among population-based samples of Polish migrants in the Netherlands and contained sufficient information, most importantly about health, for the assessment of health selection into migration. These data were combined with those from two surveys of Polish natives in Poland collected at approximately at the same time.

Polish migrants in The Netherlands

The four migrant surveys used were Wave 1 of the Families of Poles in the Netherlands (FPN), Wave 1 of the New Immigrant Survey – The Netherlands (NIS2NL), and the 2015 and 2020 editions of the Survey on the Integration of Minorities (Dutch: *Survey Integratie Minderheden*; SIM2015 and SIM2020). The aim of the FPN survey was to enable research on Polish migrants' family lives, including family formation, generational interdependencies, espoused family obligations and life outcomes (Karpinska *et al.* 2016). FPN Wave 1 data collection started in October 2014 and lasted until April 2015. The focus of NIS2NL is on early integration processes of recent migrants to the Netherlands (Lubbers *et al.* 2018). Data of the first wave of NIS2NL were collected between late 2013 and early 2014. The aim of the SIM2015 and SIM2020 surveys carried out by the Netherlands Institute for Social Research was to monitor the structural and socio-cultural position of people with a migration background in the Netherlands (Andriessen and Kappelhof 2016; Dagevos and Kappelhof 2022). SIM2015 and SIM2020 data collection took place between January 2015 and July 2015, and between March 2020 and January 2021, respectively.

For all surveys, random samples of Polish-born people registered in the Netherlands were drawn from the Dutch municipal registry (Dutch: *Basisregistratie personen*), which is a record of all persons who are officially registered on an address in any municipality in the Netherlands. Note that newcomers in the Netherlands who intend to stay in the country for more than 4 months are required to register in the municipality where they reside. The sampling frames for the FPN survey, SIM2015, and SIM2020 contained people registered in and after 2004; that for the NIS2NL contained people registered between January 2013

and January 2014. The response rates for these surveys ranged from 31.9% for NIS2NL to 51.5% for FPN. For the FPN and SIM2015 surveys, data were partly collected via face-to-face interviews and partly via online surveys. Given that lockdown measures to contain the COVID-19 pandemic were in place during part of the SIM2020 data collection period, the possibility to participate via video interviews was offered as an additional option to SIM2020-respondents. NIS2NL data were collected via online and written questionnaires. Respondents to all four surveys could participate in Polish.

Polish natives in Poland

Data on Polish natives living in Poland were obtained from rounds 7 and 9 of the Polish edition of the European Social Survey (ESS) (European Social Survey 2018, 2021). ESS is a repeated cross-sectional multi-country survey that aims to monitor changing public attitudes and values in Europe, to advance and consolidate improved methods of cross-national survey measurement in Europe and beyond, and to develop a series of European social indicators. Round 7 data were collected between April 2015 and September 2015, and round 9 data were collected between October 2018 and March 2019. Although the timing of data collection for round 10 of ESS Poland coincided better with that for the SIM2020, round 9 data were used because information on parental educational attainment – a relevant potential confounder – was not collected in round 10.

The Polish edition of the ESS had two sampling domains. For towns and cities with more than 50,000 inhabitants, random samples of inhabitants were drawn. People residing in towns and villages with fewer inhabitants were sampled in a two-stage procedure. First, towns were drawn randomly with replacement and prior probabilities proportional to the number of inhabitants aged ≥ 15 years. Then, random samples of individuals were drawn from the selected municipalities. Overall response rates were 65.8% for ESS round 7 and 60.4% for ESS round 9. In both rounds, data were collected via face-to-face interviews.

Analytical sample

Table 1 provides an overview of respondent inclusion in the analytical sample for this study. In the first step, the sample was restricted to 4,694 Polish migrant survey participants in the Netherlands and 3,086 Polish native survey participants in Poland. From the former group, 3,306 (70.4%) individuals who had lived in the Netherlands

Table 1. Procedure for inclusion in the analytical sample.

	Cases (migrants)				Controls (non-migrants)	
	FPN	NIS2NL	SIM2015	SIM2020	ESS Round 7	ESS Round 9
Total number of respondents	1,131	4,808	6,829	5,323	40,185	49,519
Polish migrants in Netherlands / Polish-born people living in Poland	1,131	1,755	1,129	679	1,598	1,488
Recently arrived (up to 3 years) Polish migrants	227	859	219	83	-	-
Complete information on all variables of interest	213	815	183	77	1,527	1,401
Inclusion in analytical sample after case-control match ^a	207	786	144	73	1,115	728

Notes: ^aCases from FPN, NIS2NL and SIM2015 were matched to controls from ESS Round 7. Cases from SIM2020 were matched to controls from ESS Round 9.

for more than 3 years at the time of data collection were excluded, leaving 1,388 respondents. Next, 100 of the remaining 1,388 Polish migrants (7.2%) and 158 of the remaining 3,086 Polish natives (5.1%) were deleted listwise due to missing values on at least one variable of interest. Finally, as described in further detail in the subsection about the analytical strategy, only migrants and natives matching on a range of background characteristics relevant to the estimation of health selection into migration were included, given the current study's analytical approach. Consequently, 78 of the remaining 1,288 Polish migrants in the Netherlands (6.1%) who could not be matched to a Polish native living in Poland were excluded. Similarly, 1,085 of the remaining 2,928 Polish natives living in Poland (37.1%) were dropped from the sample, because they were not matched to a Polish migrant in the Netherlands. Note that in a case-control design such as adopted in the current study, the generalizability of the results may be affected when large proportions of cases cannot be matched to controls, but not when many potential controls cannot be matched to cases (Carlson and Morrison 2009). The final analytical sample ($n = 3,053$) consisted of 1,210 recent Polish migrants to the Netherlands and 1,843 highly similar Polish natives in Poland.

Measures

The outcome variable for this study was migration from Poland to the Netherlands. It was measured with a dichotomous variable that distinguished recently arrived Polish migrants included in the four migrant surveys from Polish-born respondents included in ESS rounds 7 and 9.

The central explanatory variable was self-reported health status, determined with the question ‘How is your health in general?’. The wording of the question was slightly different in the NIS2NL survey (‘How would you rate your current health?’). In all surveys, five response options (‘very good’, ‘good’, ‘fair’, ‘bad’, and ‘very bad’) were provided. This single-item measure of general health was the only health measure available in each of the datasets analyzed, and it has also been used in previous research on selection in migration (e.g. Van Dalen and Henkens 2013; Ro *et al.* 2016). It is known to be a valid indicator of general health and a strong predictor of mortality (Idler and Benyamini 1997; Bowling 2005; Baćak and Ólafsdóttir 2017). I collapsed the ‘fair’, ‘bad’, and ‘very bad’ categories into a single ‘less than good health’ category because only 88 and 10 respondents reported that their health was ‘bad’ and ‘very bad,’ respectively.

The potential confounders accounted for in the analysis, due to their associations with emigration (e.g. Anacka and Okólski 2010; Stecklov *et al.* 2010; Dustmann *et al.* 2015; Fuller-Thomson *et al.* 2015; Okólski 2021; Witte *et al.* 2021) as well as with health (e.g. Balabanova and McKee 2002; Gugushvili *et al.* 2019; Lubbers and Gijsberts 2019; Zatoński *et al.* 2021; Van den Broek 2021a), were gender, age category, educational attainment, parental educational attainment, and the data collection period. In the public-release version of the SIM datasets used in this study, respondents’ age was only made available as a categorical variable. Thus, the age variables from all other datasets were harmonized with the SIM2015 categorization: 15–24, 25–34, 35–44, 45–54, and 55–64 years. Educational attainment was categorized as low (lower secondary education degree or less), intermediate (upper secondary or vocational), and high (at least bachelor’s degree or equivalent), and recorded for each respondent and his/her most-educated parent. The data collection period was dichotomized (2013–5 and 2018–20).

Analytical strategy

Matched case–control analysis

Although a large number of people have migrated from Poland to the Netherlands in the post-2004 period, the likelihood that a given person in Poland moved to the Netherlands during an observation period of a few years is very low. Lacy (1997) noted that a case–control design is suitable for social scientists wishing to efficiently study the drivers of such rare events. Epidemiologists often use this retrospective design to shed light on

potential risk factors for rare health conditions and diseases. This approach enables the assessment of whether cases with the outcome of interest (here, recent migration from Poland to the Netherlands) differ systematically from a group of highly similar controls without the outcome of interest (here, Polish natives living in Poland) with regard to an attribute that is a suspected antecedent of the outcome (here, health status). Outside of epidemiology, case-control analyses have been used to assess, for instance, whether participation in continuing professional development is associated with reduced odds of public complaints against physicians (Wenghofer *et al.* 2015), links between various types of unemployment and the commission of property crimes (Kleck and Jackson 2016), and how particular social media behaviors predict violent behavior among radical individuals (Wolfowicz *et al.* 2021).

As case-control analyses are performed with samples that are stratified disproportionately according to the rare outcome of interest, predicted probabilities of the outcome and marginal effects of explanatory variables cannot be estimated. The estimated odds ratios are not biased by the sampling strategy, however, and closely approximate the relative risk ratio associated with the explanatory variable of interest when the outcome of interest is rare, as in the current study (Cornfield 1951; Cummings 2009).

To account for potential confounding, I assessed health selection into migration from Poland to the Netherlands by estimating conditional logistic regression models for matched case-control groups (Breslow *et al.* 1978). Respondents were first assigned to strata that were perfectly homogenous with regard to all potential confounders described in the subsection on measures: gender, age group, educational attainment, parental educational attainment and period of data collection. Only strata that contained at least one case and control were considered in the analyses. In the main model specification, the ratio at which cases were matched to controls was allowed to vary across strata. Essentially similar to a fixed-effects logistic regression model, the conditional logistic regression model only analyzed differences in migration status and health status *within* strata of people that were similar on the potential confounders considered. This means that potential confounding by (the interplay of) these factors was accounted for.

Sensitivity analyses

I estimated several additional models to assess the robustness of the main model results. In a second model, I repeated the main analysis with a

subsample that consisted only of cases and controls for whom data were collected in the 2013–5 period. This was done, because for the main analysis cases derived from the 2020 edition of SIM had to be matched to controls selected from ESS Round 9 collected in 2018 due to the unfortunate absence of information on parents' educational attainment in Round 10 of the ESS Poland. The data collection for this subset of cases and controls thus took place two years apart. Moreover, data for the cases, but not the controls, in this subset were collected during the COVID-19 pandemic, which may have negatively affected the cases' health status (Shen and Bartram 2021).

A third model was estimated to assess whether the results of the main analysis were affected by the low response rates in some of the migrant surveys used. As pointed out in the data section, there were substantial differences in the response rates of the four migrant surveys used in the current study. Given that poor health can be associated with survey non-response (Van Loon *et al.* 2003), migrant surveys with low response rates may paint an overly positive picture of the health of migrants. This, in turn, may lead to an overestimation of health selection into migration. I thus repeated the main analysis using only migrant data from the FPN survey ($n = 207$), which had the highest response rate among migrant surveys, and data from 867 matched controls.

In a fourth model, cases and controls were not only matched on gender, age category, educational attainment, parental educational attainment, and period of data collection, but also on region (i.e. 1] province of residence prior to migration for the cases and actual province of residence for the controls). This additional analysis was performed because considerable differences in emigration rates (Anacka and Okólski 2010; Dustmann *et al.* 2015) and health (Wojtyniak & Stokwizewski, 2012) have been noted among Polish provinces. As this information was available only in the ESS and NIS2NL datasets and due to the stricter matching criteria, the subsample for this analysis consisted of 469 cases and 521 controls.

Finally, I estimated a fifth model in which cases were matched to controls at a fixed 1:1 ratio. This is in contrast to the other models where all respondents in strata that contained at least one case and control were included in the analytical sample, and the cases-to-controls matching ratio was allowed to vary across different strata. The use of a flexible matching ratio benefits the statistical power and, consequently, the precision of coefficient estimates, but it results in a relatively heavy weighting of cases matched to many controls. The use of a fixed ratio eliminated this potential source of bias. When multiple controls could be matched to a case, one control

was assigned randomly. When the number of cases with a particular set of background characteristics exceeded the number of potential controls with similar characteristics, randomly chosen excess cases were excluded. Maintaining a fixed 1:1 case-to-controls ratio resulted in an analytical sample of 672 recently arrived Polish migrants in the Netherlands and, by design, the same number of similar Polish natives who stayed in Poland.

A replication file for all data preparation and analyses is available on the Open Science Framework (OSF): <https://doi.org/10.17605/OSF.IO/CBYNA>.

Results

Descriptive results

Table 2 provides an overview of the sample characteristics. The analyses revealed a pronounced and systematic difference in health between the

Table 2. Sample characteristics; percentages and numbers.

	Cases (migrants)		Controls (non-migrants)		Test of difference
	%	(N)	%	(N)	
Self-rated health:					$\chi^2(2, N = 3053) = 54.3, p < .001$
Very good	38.9%	(471)	30.4%	(560)	
Good	48.7%	(589)	47.4%	(874)	
Less than good	12.4%	(150)	22.2%	(409)	
Gender:					$\chi^2(1, N = 3053) = 26.3, p < .001$
Female	65.2%	(789)	55.9%	(1,030)	
Male	34.8%	(421)	44.1%	(813)	
Age:					$\chi^2(4, N = 3053) = 344.1, p < .001$
15–24 years old	26.6%	(322)	21.5%	(396)	
25–34 years old	50.3%	(609)	24.9%	(458)	
35–44 years old	15.9%	(192)	24.5%	(451)	
45–54 years old	5.0%	(61)	17.3%	(318)	
55–64 years old	2.1%	(26)	11.9%	(220)	
Educational attainment:					$\chi^2(2, N = 3053) = 86.3, p < .001$
Low	15.5%	(188)	15.4%	(284)	
Intermediate	46.2%	(559)	61.3%	(1,130)	
High	38.3%	(463)	23.3%	(429)	
Educational attainment parents:					$\chi^2(2, N = 3053) = 196.8, p < .001$
Low	28.1%	(340)	20.7%	(381)	
Intermediate	43.1%	(521)	67.1%	(1,236)	
High	28.8%	(349)	12.3%	(226)	
Period of data collection:					$\chi^2(1, N = 3053) = 422.8, p < .001$
2013–2015	94.0%	(1,137)	60.5%	(1,115)	
2018–2020	6.0%	(73)	39.5%	(728)	
Respondents	1,210		1,843		

Notes: Data are from the Families of Poles in the Netherlands survey (wave 1), New Immigrant Survey – The Netherlands (wave 1), Survey on the Integration of Minorities (2015 and 2020), and European Social Survey (rounds 7 and 9).

cases and controls. More Poles who migrated to the Netherlands than natives who stayed in Poland reported having very good health, and few of them reported having less than good health.

It is important to note, however, that migrants and their counterparts who remained in Poland were not distributed evenly across strata. They differed systematically with regard to all potential confounders considered: gender, age category, educational attainment, parental socioeconomic status, and period of data collection. The proportion of women was larger among the migrants than among their counterparts who stayed in Poland. Consistent with previous findings (Anacka and Okólski 2010; Dustmann *et al.* 2015; Ichou and Wallace 2019; Witte *et al.* 2021), relatively more migrants than Polish residents were included in strata characterized by younger age and high respondent and parental educational attainment.

Conditional logistic regression results

The results of the conditional logistic regression analyses are presented in Table 3. In addition to coefficient estimates and 95% confidence intervals, odds ratios, i.e. exponentiated coefficients, are presented. As described in the methods section, odds ratios can be interpreted as close approximations of risk ratios in case–control analyses of rare events (Cummings 2009).

Model 1, estimated on the full analytical sample, showed that Polish people who rated their health as good and less than good were approximately 0.73 and 0.55 times as likely, respectively, as those who rated their health as very good to migrate to the Netherlands. Post-estimation results, also shown in Table 3, indicated that the likelihood of migration to the Netherlands was lower, approximately by a factor 0.75, for people who rated their health as less than good than for those who rated their health as good. All these differences were statistically significant at a conventional alpha level of $\alpha = .05$.

Models 2–5 were estimated to assess the robustness of the model 1 findings, accounting as much as possible for potential bias and confounding due to cases' exposure to the COVID-19 pandemic (model 2), potential health selection in migrant surveys with low response rates (model 3), regional differences (model 4), and the relatively large impact on the estimates of migrants who were, on the matching criteria considered, similar to large numbers of non-migrants (model 5). Although these models were estimated with different subsamples, some of which did not case any cases in common (e.g. models 3 and 4), the estimated impact of having good or

Table 3. Results of conditional logistic regression analyses predicting migration from Poland to the Netherlands.

	Model 1			Model 2			Model 3			Model 4			Model 5		
	Coeff.	[95% CI]	OR	Coeff.	[95% CI]	OR	Coeff.	[95% CI]	OR	Coeff.	[95% CI]	OR	Coeff.	[95% CI]	OR
Self-rated health:															
Very good	Ref.			Ref.			Ref.			Ref.			Ref.		
Good	-0.32**	[-0.53,-0.11]	0.73	-0.38**	[-0.61,-0.15]	0.68	-0.37†	[-0.75,0.01]	0.69	-0.47**	[-0.78,-0.16]	0.62	-0.35**	[-0.60,-0.10]	0.70
Less than good	-0.60***	[-0.89,-0.31]	0.55	-0.65***	[-0.96,-0.34]	0.52	-0.62*	[-1.19,-0.06]	0.54	-0.67**	[-1.11,-0.22]	0.51	-0.59***	[-0.93,-0.24]	0.56
Δ Less than good vs good	-0.28*	[-0.55,-0.12]	0.75	-0.27†	[-0.55,0.02]	0.76	-0.25	[-0.80,0.29]	0.78	-0.20	[-0.60,0.21]	0.82	-0.24	[-0.56,0.08]	0.79
Data sources included:															
FPN	Yes			Yes			Yes			No			Yes		
NIS2NL	Yes			Yes			No			Yes			Yes		
SIM 2015	Yes			Yes			No			No			Yes		
SIM 2020	Yes			No			No			No			Yes		
ESS 7	Yes			Yes			Yes			Yes			Yes		
ESS 9	Yes			No			No			No			Yes		
Additional matching on region	No			No			No			Yes			No		
Matching ratio	Flexible			Flexible			Flexible			Flexible			Fixed at 1:1		
N cases	1,210			1,137			207			469			672		
N controls	1,843			1,115			867			521			672		
N total	3,053			2,252			1,074			990			1,344		

Notes: Coeff.: coefficient; OR: Odds Ratio; 95% CI: 95% Confidence Interval; † $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$.

less than good health as opposed to very good health on the likelihood of emigration was very robust across all models. Possibly due to the lower statistical power, models 2–5 provided no evidence that the likelihood of migration to the Netherlands differed systematically between people with good (but not very good) health and people with less than good health.

Discussion

Despite large migration flows from CEE countries in general and Poland in particular to Western-European countries (OECD 2012), there has been a dearth of research on health selection into migration to Western Europe among people from Poland or other CEE countries. The current study contributes to the filling of this gap in the literature. Scholars have argued that health selection in migration is most pronounced when the obstacles to be overcome (e.g. restrictive immigration policies in destination countries and large geographical distances) are large (Feliciano 2020; cf. Lu and Li 2020). The results of the current study provide evidence that Poles rating their health as very good were almost twice as likely as those rating their health as less than good to migrate to the Netherlands, despite the country's proximity to Poland (cf. Engbersen *et al.* 2013) and the freedom to move between the two countries that Polish people enjoy as EU citizens (cf. Gerhards 2008). This finding suggests that health selection into migration is not restricted to the most challenging trajectories with regard to geographical distance or barriers caused by restrictive immigration policies.

Additional research is needed to better understand the factors underlying this marked health gradient in migration from Poland to the Netherlands, also in the absence of restrictive immigration policies or excessive geographical distance between the country of origin and the destination country. It may, for instance, be possible that there are other important barriers to migration from Poland to the Netherlands for people in suboptimal health. Difficulties for Polish people with speaking the Dutch language and, relatedly, with navigating Dutch institutions and specifically the healthcare system may be relevant in this regard. Upon arrival in the Netherlands, Polish migrants rarely have a good command of Dutch (Gijsberts and Lubbers 2014), and some also struggle with speaking English (Dijkstra *et al.* 2021). The Dutch healthcare system may be particularly difficult to navigate without Dutch language proficiency (Goorts and Smal 2022). Many Polish migrants in the Netherlands, particularly those lacking such proficiency, continue to use healthcare services in Poland (Van den Broek 2021b). Future studies could explore whether this

inaccessibility of the Dutch healthcare system specifically discourages Polish people in suboptimal health to migrate to the Netherlands, given that access to healthcare is plausibly a particularly salient issue for them.

The results of this study may also reflect the importance of health-related differences in the returns on migration, beyond the ability to overcome migration-related obstacles. When people in suboptimal health have less to gain by migrating than their healthier counterparts then it may make them less inclined to migrate from Poland to the Netherlands (cf. Sjaastad 1962; Jasso *et al.* 2004). In this light, it is important to note that relatively many Polish labor migrants in the Netherlands work in construction, agriculture, and the industrial sector (Gijsberts *et al.* 2018). People in suboptimal health may often not be able or willing to work in these sectors, because of the physically demanding nature of the work.

Some limitations of the current study should be considered. First, the case-control design used in the current study is retrospective. Hence, the self-reported health of recent migrants included in the study was effectively a proxy measure for health prior to migration. The documented declines in Polish migrants' health with increased length of stay in the Netherlands (Lubbers and Gijsberts 2019) and the relatively low return migration rates of CEE migrants with less than good health (Vanthomme and Vandenhede 2021) suggest that subjective health prior to migration may have been better in many cases. This would suggest that the estimate of health selection into migration in this study is conservative. The retrospective nature of the study also complicated the process of matching according to potential confounders. This is because cases and controls could not be matched on potentially relevant characteristics *prior to emigration*, e.g. partner and parenthood status, as only contemporaneous rather than retrospective data were collected in most surveys. Matching on contemporaneous information would be problematic, because matters like people's partner status and parenthood status may in the years after migration well be affected by their decision to migrate. Although the exact matching approach adopted in the current study accounts for all distributional differences in the potential confounders considered, including every possible interaction between them, it may still yield biased results if there are confounding pre-migration characteristics that cannot be matched on (cf. Iacus *et al.* 2012).

Second, the migrant samples were drawn from the Dutch municipal registry. Engbersen *et al.* (2013) made a typology of CEE labor migrants in the Netherlands, and noted that the rates of registration in this registry were relatively low among so-called footloose and circular migrants. Circular

migrants are mostly seasonal workers who are strongly attached to their origin countries, whereas footloose migrants are typically young migrants who are neither strongly attached to their origin countries nor committed to staying in destination countries. Thus, the results of the current study may not be applicable to footloose and circular migration.

Third, the study sample was not sufficiently large for the assessment of potential heterogeneities in the impact of health on migration. This is unfortunate, because prior work focusing on other contexts suggests that health selection into migration differs, for instance, by gender (Rubalcava *et al.* 2008). When more and larger migrant surveys become available, it would be particularly interesting to test whether the health gradient in migration from Poland to the Netherlands varies by migration motive. If health selection into migration is stronger among people who migrated for work reasons than for people who migrated to study in the Netherlands or to be reunited with family, then this would highlight the importance of differences by health status in the returns to migration for the decision to migrate.

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No potential conflict of interest was reported by the author(s).

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Data availability statement

Access to all datasets used in the current study can be requested via the following URLs: FPN: <https://doi.org/10.17026/dans-zep-et7y>; NIS2NL: <https://doi.org/10.17026/dans-22u-7kad>; SIM2015: <https://doi.org/10.17026/dans-x63-dq58>; SIM2020: <https://doi.org/10.17026/dans-26h-xn4n>; ESS round 7: https://doi.org/10.21338/ess7e02_2; ESS round 9: https://doi.org/10.21338/ess9e03_1.

Ethics statement

Ethical approval was not required for this secondary analysis of anonymized public-release versions of existing datasets.

Additional information

A replication file is available on the Open Science Framework (OSF): <https://doi.org/10.17605/OSF.IO/CBYNA>.

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