Potential migration of Czech medical students with special regard to migration drivers and barriers

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ABSTRACT

This article examines the phenomenon of potential international migration among Czech medical students, with the objective of identifying prospective and actual migrants and analyzing the underlying motivations, intended durations of migration, the roles of institutional structures versus social networks, the strength of social ties, preferred destinations, and perceived barriers to mobility. Anchored in selected established migration theories and conceptual frameworks, the study deployed an electronically administered questionnaire targeting 397 fourth – to sixth-year General Medicine students across four faculties of Charles University (Czechia) during March–April 2022. Data analysis was conducted using SPSS software, incorporating factor analysis and binary logistic regression. Despite a generally higher inclination toward migration, only 7% of respondents exhibited a strong likelihood of actual emigration when specific preparatory steps and intended timelines were considered. This subset of students, characterized by clearly articulated goals to enhance professional and financial prospects, reliance on transnational social networks, preference for extended stays abroad, and a diminished likelihood of return, contrasts markedly with the broader cohort of less committed potential migrants. Proficiency in German emerges as a key determinant for Czech medical students, particularly in the context of migration to German-speaking countries such as Germany, Austria, and Switzerland, while English-speaking countries like the USA and Canada remain attractive destinations too. Beyond language competencies, prior international work or study experience were found to significantly inform students' migration trajectories. Nevertheless, the most prominent deterrent to migration remains the anticipated loss of familial and social connections.

KEYWORDS

potential emigration; medical students; regression analysis; Charles University; Czechia

Received: 6 May 2025
Accepted: 26 October 2025
Published online: 27 November 2025

Šimůnek, M., Drbohlav, D. (2025): Potential migration of Czech medical students with special regard to migration drivers and barriers. AUC Geographica, e23361980.2025.21
https://doi.org/10.14712/23361980.2025.21
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1. Introduction

International migration and recruitment of health professionals is receiving increased attention globally. The World Health Organization reported in 2016 that there is a shortage of 2.8 million physicians worldwide (World 2016). Professions related to the health sector are in high demand even in the developed countries of the world, where this problem is mainly addressed by recruiting doctors from abroad (Ikenwilo 2007; Vavrečková 2007). The migration of health professionals is steadily increasing, mainly due to demographic problems, which include the high average age of doctors and a generally growing aging population with a greater need for medical care, generally increasing the demand for health and social services. European Union (EU) countries are no exception to these trends (Bojanic et al. 2015; Dodani and LaPorte 2005; IHS Markit 2021; Żuk et al. 2019).

The problems have been compounded by the impact of the Covid-19 pandemic, which broke out globally in the early 2020s (it did not subside until early 2022), causing an overload for physicians worldwide (Bojanic et al. 2015; IHS Markit 2021). In Czechia, students in the final years of medical faculties and secondary medical schools were called up due to the limited capacity of the medical staff (iROZHLAS 2020). The American Medical Association has stated that overload is so high that it can lead to burnout syndrome and physicians leaving practice (IHS Markit 2021).

In many EU countries (including Czechia), physician emigration is perceived as a relatively large societal problem, especially for young doctors and graduates (Bojanic et al. 2015; Humphries et al. 2021; Krajewski-Siuda et al. 2012; Żuk et al. 2019). This is mainly due to the fact that healthcare workers seek opportunities that match their skills, qualifications, individual preferences, and need for higher earnings (Brennan et al. 2023; de Vries et al. 2023; Dodani and LaPorte 2005; Lee 1966).

The main aim of this paper is to examine the potential migration of physicians, specifically medical students, in Czechia. Hence, two important gaps in the current knowledge will be addressed. First, we compare our research findings with those from the early 2000s (Vavrečková et al. 2006). Second, we introduce a comparative international perspective by examining the nature and determinants of migration preferences in Czechia in relation to other EU countries – particularly in Central and Eastern Europe, such as Poland, Croatia, and Romania (see sources below).

This study seeks to identify the importance of potential and actual (although not yet realised) migration abroad of Czech medical students studying at Charles University (the oldest Czech university with the most students[1]). It also examines the destinations, the expected length of stay, the motivations that lead medical students to leave and the barriers that prevent them from leaving. Particular attention is paid to finding out how potential and actual respondent-migrants differ and what role institutions, as well as family and other personal networks play in the potential migration movement of medics. This research also supplements studies carried out in other EU countries with similar socio-economic development (Poland – Krajewski-Siuda et al. 2012; Pszczółkowska et al. 2024; Croatia – Bojanic et al. 2015; and Romania – Apostu et al. 2022).

The paper briefly introduces several concepts, through which we can better understand and interpret our data. This is followed by an evaluation of selected relevant sources with an introduction to the health context of Czechia. The objectives and research questions precede the methodological approach and methods used. After the presentation of the research results, the paper concludes with a discussion and conclusions.

2. Theoretical framework

For better understanding and interpreting the results of our study, we make use of the following conceptual frameworks:

The migration push and pull model (Lee 1966; and many other researchers) is a concept contributing to understanding which factors influence migration processes and how. The model is the result of oppositely acting forces – the so-called "pull", which attracts a person to a given place of residence, and the push, which drives them from their initial place of residence.

Migration network theory enriches the push and pull model with linkages between the migrants themselves (Light et al. 1989). This theory is defined as a set of interpersonal ties that link prospective migrants, former migrants and non-migrants in source and destination countries in the form of kinship, friendship or community ties (Massey 1988, 1993). These migration networks provide important assistance in overcoming barriers to migration and subsequent integration. Migration networks can be distinguished according to the depth of social ties and the nature of the interaction into two basic types, namely strong ties (personal social networks) and weak ties (wider social networks) (Boyd 1989; Granovetter 1973). According to Granovetter (1973), weak ties tend to be more important in obtaining employment opportunities, while emphasizing that these weak ties create bridges between nodes of strong relationships. In addition to direct contacts, online social networks

1 In 2024, Charles University had a total of 53,219 students enrolled, 14,562 of whom were studying at medical faculties. Masaryk University, the second-largest institution, had 33,531 students enrolled, 4,786 of whom were studying at medical faculties (MŠMT 2024).

have recently emerged and play an important role in communication too.

Very simply put, "the neoclassical economics model assumes that people move abroad permanently to maximize lifetime earnings, whereas the new economics of labour migration assume they leave temporarily to overcome market deficiencies at home" (Constant and Massey 2002: 5).

Institutional theory emphasizes the role of institutional actors in influencing migration. These mostly include the government, financial institutions, real estate agencies, law firms, social and humanitarian organisations, non-governmental agencies, as well as mafia-type structures. All of these are significantly involved in shaping the migration behaviour of the population. They reinforce and benefit from migration flows.

The given conceptual framework includes selected, yet highly important aspects of migration motivation and migration mechanisms, which are reflected in both migration preferences and actual migration – at the micro level of the individual migrant as well as from the perspective of meso- and macro-structural attributes. The selection of these theories and concepts, also makes it possible to better understand the determinants of migration and migration preferences in both the source and destination countries. Equally important is the interconnection of the applied theories/concepts, which further enhances their explanatory value.

In the text below, we only discuss the factors and contingencies that emerge in the reality of potential and real migration of medics and doctors from relatively developed countries (including Czechia) to the most developed ones. First, we will characterize the motivations and barriers of the given migration, and then the positive and negative consequences.

2.1 Drivers and barriers to migration

Migration of medical professionals is driven by a complex interplay of macro-level and micro-level factors, ranging from economic incentives to personal aspirations. Countries with high economic performance tend to have higher market wages than countries with lower economic performance. This causes workers to migrate from regions with lower wages to regions with higher wages (IOM 2014; Massey 1993). Even in the medical sector, the most commonly cited economic drivers of migration are average gross wages and related taxes for physicians (Tjadens et al. 2013). Additionally, the process of medical specialization requires post-graduate examinations, which often delay the full financial benefits of the profession in the country of origin, particularly in Czechia (Tjadens et al. 2013; Sedláková 2015).

A very important aspect of migration, especially for future doctors, is the quality of postgraduate education, which can vary widely (Sedláková 2015). Studying abroad can also give future doctors an advantage over those studying in their home country, for example, in career progression, as is the case in Ireland (Akl et al. 2007; Humphries et al. 2021). Then there are the better working conditions abroad, which can include high quality equipment, less bureaucracy, shorter working hours or even less overtime, top-notch co-workers, as well as a favourable social climate. In some countries (e.g. Poland, Germany), on the other hand, it is perceived that older doctors are promoted over younger ones, which creates a bad climate in health care institutions (Tjadens et al. 2013; Docquier 2006). The recognition of diplomas and attestations throughout the EU definitely contributes to international migration in the health care sector (Vavrečková and Gazdagová 2005). Directive 2005/36/EC ensures recognition of qualifications across the EU, easing administration and enabling smooth integration into healthcare systems (Gkolfinopoulos 2016). Among geographical factors, geographical proximity to economically stronger countries is particularly important (Tjadens et al. 2013). In general, the more distant the home country is from the destination country, the more migration decreases (Fields 1979).

On the micro level, social networks are of paramount importance. For migrants, it is very important to maintain contact with someone from abroad or to know someone in their close circle who lives abroad. If such contacts are maintained, it is much easier for the person to make the decision to migrate. This is greatly helped nowadays by new technologies such as Facebook, Whatsapp etc. (Tjadens et al. 2013). Social networks can facilitate migrants' access to job opportunities and can also have a positive effect on the eventual integration process. They also support the emergence of subcultures, which can greatly benefit immigrant groups (Horáková 2007). Furthermore, social networks are considered a very reliable source of information, which is one of the key aspects in migration decision-making (Schumann et al. 2019).

Personal factors are also very important in highly skilled migration. The main determinant within this area is generally an improvement in quality of life (Horáková 2007). Long-term migration can increase the possibility of personal development, the development of language skills or the fulfillment of the desire to experience new cultures and lifestyles (Tjadens et al. 2013). Health systems are broadly similar around the world, allowing students and doctors to travel around the world without having problems finding a job in this sector (Sedláková 2015; Tjadens et al. 2013).

Despite strong push and pull factors, various barriers can deter medical professionals from emigrating. For young doctors, not knowing a foreign language, the impossibility of easy communication with patients, can be one of the major personal barriers (Bojanic et al. 2015; Krajewski-Siuda et al. 2012). Other barriers that have been frequently cited in

previous research include separation from family and friends (Gouda et al. 2015). Financial factors that may prevent long-term migration are also quite numerous. The financial costs of moving and adapting to life in the destination country represent one of the key challenges (Lee 1966). One of the other significant barriers to mobility may be visa procedures, and regulations for working as a physician, such as licensing and registration fees that are in place in the USA or the UK, for example (Brennan et al. 2023; Schumann et al. 2019).

2.2 Consequences

In general, from the perspective of the country of origin, the negative consequences of migration of future doctors or highly skilled labour tend to prevail. Quite a number of studies have concluded that the outflow of highly skilled workers from medicine contributes significantly to the shortage of medical personnel, the consequences of which affect mainly the quality of medical care in countries of origin (Boncea 2013; Żuk et al. 2019). Countries lose not only investment in medical education but also the health care workforce (Dodani and LaPorte 2005). In addition, as the migration of young doctors increases, what happens is that the workforce ages faster in the source country, leading to a growing shortage of doctors – there is a lack of new doctors to replace older doctors who retire (IOM 2014). In the short term, the biggest problem is the shortage of qualified medical staff and the problems that are tied to this (Gouda et al. 2015). However, migration of doctors for work can also turn into permanent migration much more easily than before, especially due to higher wages or better working conditions abroad. This is also facilitated by the fact that it is much easier for EU residents to migrate with their families across the EU (Suciu et al. 2017).

Among the positive consequences, skilled medical professionals gain new knowledge and skills that they can bring to the domestic health system if they return to their country of origin (Docquier 2006; Suciu et al. 2017). Furthermore, these returnees can introduce new medical practices. And they can also create an imaginary bridge with those who are still abroad (Bojanic et al. 2015). Thus, return migration can, among other things, create international scientific networks, which in turn can increase and facilitate the movement of people and goods, but also ideas, and can contribute to an increase in foreign direct investment, including in the health sector (Docquier and Rapoport 2012). Return migration can also be seen as another source of "brain gain", where doctors who return to their country of origin bring new experience and knowledge that they have gained in the most developed countries (Docquier 2006; Levitt 1998 and her concept of social remittances). Financial remittances can also be counted among the positive consequences.

3. Context of Czechia

The OECD statistics (2021) show that Czechia is in a relatively good position in terms of the number of newly graduated doctors (17 per 100,000 population – STATISTA 2024, Fig. 1); in absolute terms between 2016 and 2020 – 1,035 newly registered Czech doctors in Czechia per year (Czech 2021), and in terms of the total number of doctors (4.1 per 1,000 population). According to OECD statistics (2021), the feminization of the Czech health care system continues (56% of doctors are women) and the process of aging of health professionals is underway (14% of doctors are over 65 and another 19% are aged 55–64; only 23% of doctors are under 35). In terms of equipment

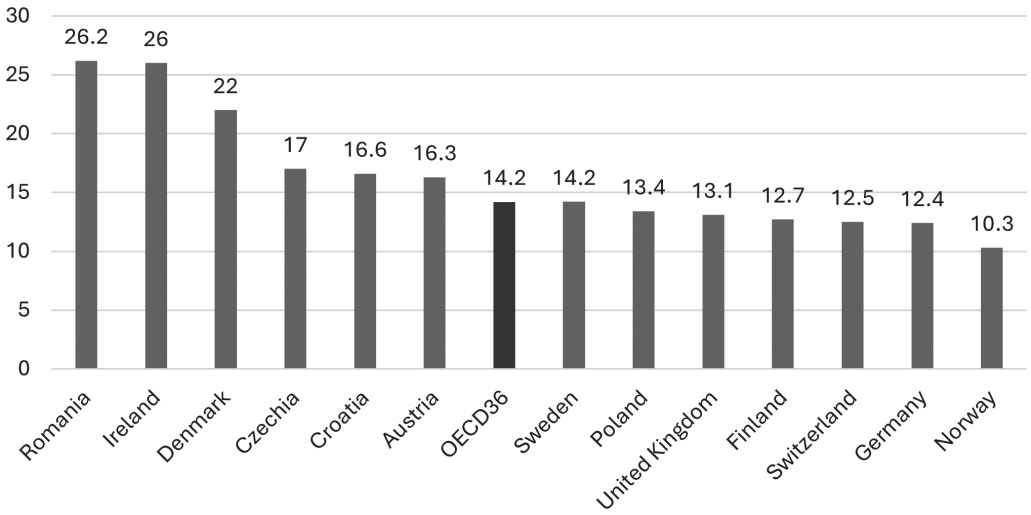

Fig. 1 Graduates of medicine in OECD countries in 2021 (per 100,000 population).
Note: The table displays a selection of OECD countries.
Source: STATISTA (2024).

with modern technology, as measured by the number of CT (computed tomography) scanners and MRI (magnetic resonance imaging) units, Czechia suffers from under-equipment in a European comparison (OECD 2021).

While in Czechia all the administrative work is done by doctors, in the most developed countries doctors are to some extent spared the administrative burden (Vavrečková et al. 2007). This mismatch reflects the structural push factors outlined in traditional migration theory, particularly those relating to workload and inadequate system resources (Lee 1966). The dissatisfaction of Czech doctors with the health care system occasionally escalates into publicized protests. Evidence of this can be seen in the "Thank You, We're Leaving" initiative of 2010/2011, which aimed to improve working conditions, especially pay and compulsory further training for doctors, or the current disputes and rejection of the existing overtime model by many doctors (e.g. ČTK 2023). These mobilisations reflect collective discontent shaped by professional identity and sustained through interpersonal and institutional networks, as described in migration network theory (Massey et al. 1993; Granovetter 1973). Such ties enhance the perceived feasibility of migration, especially among younger doctors. Between 2015 and 2019, 1,583 Czech doctors migrated abroad, most of them to the UK (506) and Germany (340).

These patterns are not unique to Czechia. Studies from Poland, Romania, and Croatia – countries with comparable healthcare systems and socio-economic contexts – consistently report high migration intentions among medical students and junior doctors (Suciu et al. 2017; Krajewski-Siuda et al. 2012; Bojanic et al. 2015). Common push factors include low pay, limited access to postgraduate training, and dissatisfaction with domestic healthcare infrastructure. However, recent evidence from Poland indicates that systemic issues – such as political instability, poor working conditions, and a climate of public distrust toward medical professionals – now outweigh remuneration as key motives (Pszczółkowska et al. 2024). Similarly, a Romanian study found that migration propensity remained high despite recent wage increases, underscoring the persistent role of structural disparities and weak institutional support (Apostu et al. 2022).

4. Objectives and research questions

The target population of our research are students of general medicine, who were interviewed using an online questionnaire survey. Based on the sources cited above, several basic research questions were defined:

- What are the migration tendencies and what is the probability of migration intention of future doctors?
- How significant is the role of institutional actors in labour migration decisions among future physicians, compared to that of family and other personal networks?
- What motives most influence future doctors when deciding whether to work abroad?
- What is the expected length of work experience of future physicians?
- Which countries are the main migration destination territories of future doctors?
- What factors prevent future doctors from going abroad to work?

5. Methodology

We use a quantitative research approach. The method of data collection was a questionnaire survey. The sample studied is made up of Czech students (those who are citizens of the Czech Republic) of the 4th-6th years studying General Medicine at the medical faculties of Charles University. 469 respondents out of a total of 2,370 students completed the questionnaire survey, giving a return rate for the survey of 20%. In editing and coding, 72 respondents were excluded due to non-Czech citizenship or insufficient completion of key questions. This resulted in a total of 397 respondents in the final sample.

The respondents were approached through the individual study departments of the medical faculties of Charles University. The data collection and the actual filling-in took place online, through an electronic questionnaire. The survey was conducted anonymously and participation was entirely voluntary. Data was collected via an online platform that did not store any personal identifiers, thereby ensuring confidentiality. Respondents were informed about the purpose of the study and how their data would be used. Online surveying was chosen for its time efficiency, ease of access via computer or mobile device, and the ability for respondents to pause and resume later. The questionnaire survey was carried out over two months (March 1, 2022 – April 30, 2022). All medical faculties of Charles University participated in the research except the 2nd Faculty of Medicine in Prague. Their management did not specify the reason for non-participation.

The sample as such was further divided into three groups, namely 96 so-called potential migrants (with further breakdown below), 240 so-called non-migrants and 61 so-called undecided, who were not counted in most statistical analyses to avoid biasing the whole research.

The initial questionnaire was designed based on our research questions and prior literature. It was then refined in collaboration with the chairman of the Young Doctors Association, whose team has prior experience of collecting data from young doctors and maintains ongoing contact with this target group.

Furthermore, the structure of the questionnaire enables to some extent comparison with a study conducted 19 years ago (Vavrečková et al. 2006).

The questionnaire consists of 21 questions and is divided into several sections. The questionnaire included closed, semi-closed, open-ended and scale questions to combine structured, quantifiable responses with deeper qualitative insights, thereby enhancing the validity and analytical richness of the data (Creswell and Creswell 2018). Respondents did not answer all items, instead, they were directed only to those questions relevant to them based on their previous answers, using filter questions to achieve this structure. The first part was used to obtain respondents´ characteristics for further classification and provide some basic information about them. The second part asked expanding questions related to language skills and previous study or work experience. The third part explored migration itself and focused on potential migrants as well as a group of undecideds. Non-migrants answered only one follow-up question on barriers to migration.

Descriptive statistics was used in the data analysis, along with more sophisticated methods. Binary logistic regression was used to predict migration intentions. This method was chosen because it enables us to estimate the probability of an outcome (intention to migrate) based on the presence or absence of explanatory variables, while also assessing their statistical significance and controlling for other factors. Factor analysis was chosen to determine the structure among the multiple items measuring barriers that were rated by respondents on a Likert scale. Due to the high dimensionality of the barrier-related items, factor analysis was used to identify latent constructs that grouped strongly correlated items. This reduced complexity. It also retained the main patterns in respondents' perceptions. In the factor analysis, which met the condition that a larger number of variables should be correlated with a value higher than 0.3 and also established the goodness of fit of the data, using the Kaiser-Maeyer-Olkin test (0.720), we use the "Principal components" method with Varimax rotation.

6. Research results

6.1 The likelihood of migration

The migration potential of medics was investigated via using a key question, i.e.: "Do you expect to work as a doctor abroad at some point after completing your current studies?" If respondents answered "definitely yes" or "rather yes", they were classified as potential migrants. If they answered "definitely not" or "rather not", they are classified as in the non-migrant group. And a "don't know" response placed respondents in the undecided group. Of the total sample, 60% fell into the non-migrant group, 24% into the potential migrant group and the remaining 15% into the undecided group. In order to better determine how many medics, out of 96 potential migrants, want to really go abroad to work, we need to determine the degree of reality of this proclaimed departure. We determined the degree of realism based on two factors – the implementation of concrete steps for the intention to work abroad and the date of departure. Focusing on the first factor, we found that 27% of medics had done nothing towards moving abroad, 39% of medics had not yet taken any concrete steps but plan to do so, and 34% of medics had already taken some concrete steps and are thus highly likely to actually migrate. The results of the second factor show that 46% of the respondents want to move abroad immediately after the completion of their current studies and 21% of the medics want to leave after the completion of the first general block of postgraduate education (this takes 30 months). For these medics, we assume that they are fairly firmly decided about going abroad for work. Furthermore, 11% of medics want to migrate after passing the final certification exam (5–6 years) or later. 23% responded that they did not know.

In order to determine as accurately as possible the reality of migration and thus determine who is an active migrant, two conditions must be strictly met simultaneously. Firstly, the individual has already taken specific steps to realize the intention to work abroad and secondly, he/she wants to go abroad either immediately after the completion of the final certification exam or after the completion of the first general block. Given these conditions, 27% fall into the group of active migrants and 73% remain in the group of potential migrants. The degree of realistic migration intention in the context of the whole sample, i.e. 397 respondents, is reflected in Fig. 2, where we see that only some 7% of the original 24% of potential migrants are active migrants.

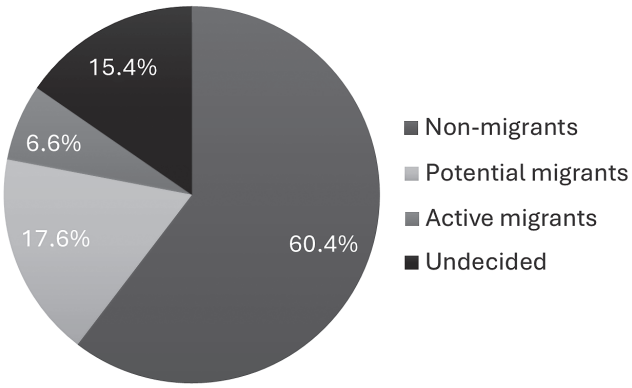

Fig. 2 Strength of the migration plan (%).
Note: N = 397; based on the question: "Do you expect to work as a physician abroad at some point after graduation?"
Options: "definitely yes", "rather yes", "I don't know", "rather no", "definitely no".
Source: own research (2022).

Tab. 1 CEFR language proficiency levels of respondents (%).

	A1	A2	B1	B2	C1	C2
English language	0.8	1.8	14.1	44.7	31.5	7.1
German language	19.9	17.9	18.2	10.3	5.5	1.0
French language	12.3	8.6	6.0	3.8	1.8	0.8
Russian language	11.8	2.3	1.5	0.3	0.0	1.3
Spanish language	12.6	5.3	4.0	1.5	0.3	0.8
other language	2.3	2.0	1.5	0.3	0.8	2.3

Note: N = 397; other languages – Italian, Polish, Norwegian, Vietnamese etc.; based on the question: "What is the level of proficiency in each language?" – For available options see more in the table.
Source: own research (2022).

6.2 Knowledge of languages and foreign experience

Participants in the study were aged 21 to 26 and 34% were male and 66% female. Knowledge of world languages is crucial for gaining a job abroad, especially knowledge of English. In the case of Czechia, German is also important due to its geographical location. The medics assessed their language skills in five basic world languages. Moreover, they also had the opportunity to supplement and rate other languages they know (Tab. 1). They assessed their proficiency on the basis of the CEFR – Common European Framework of Reference, which divides three levels of language proficiency, which are further subdivided into six levels. These levels are 'Basic' (A1, A2), 'Independent' (B1, B2), and 'Proficient' (C1, C2) (CAMBRIDGE 2022). It can be noted that 97% of medics are proficient in English at levels B1–C2, of which the B2 level is the most common (45%). However, it is worth mentioning the C1 (32%) and C2 (7%) levels too. German tends to be a secondary language for most respondents in Czechia, with 35% of medics proficient at the B1–C2 level.

When dividing the sample into potential and active migrants, the level of English is over 96% at B1–C2 for both groups. C1 is the most common level. The difference, however, can be seen in the knowledge of German language, where 46% of the active migrants have a knowledge of German at the B2–C2 level, compared to only 27% of the potential migrants. For Czech medical students, immediate readiness to speak German well seems to be one of the key factors in the decision to actually migrate to a geographically close German-speaking country.

In addition to language, study or work experience abroad can also significantly influence respondents' decision to go abroad. It is mainly about creating a network of social relationships or gathering valuable information about the country. In our research we looked at experience of more than 3 months over the last 10 years. From a total sample of 397 respondents, 15% of respondents declared that they already had such experience.[2]

2 Based on the question: "Have you studied or worked abroad in the last 10 years?" – Options: "yes", or, "no"; N = 397.

6.3 Destinations

Across the whole sample of 96 potential migrants, geographically close countries such as Germany and Austria were most frequently mentioned, followed by Switzerland. The island countries of the United Kingdom and Ireland performed slightly worse. Comparing the destination country decisions of potential and active migrants, some differences can be noticed, except for the most frequently mentioned Germany, which is represented by 25% and 27% respectively in both groups (Fig. 3). Active migrants most frequently mentioned geographically close countries, i.e. Austria and Switzerland. Potential migrants most frequently mentioned the Nordic countries, with Sweden being the most frequently mentioned, followed by the United Kingdom and Ireland.

6.4 Length of stay abroad

In terms of length of stay abroad, in the total sample of 96 potential migrants, more than half are considering return migration, with 36% of respondents expecting to return within 5 years and 17% considering staying abroad for more than 5 years. A quarter of respondents intend to stay abroad permanently. If we examine potential and active migrants separately, we can see significant differences (Fig. 4). A huge difference exists for permanent migration, with 42% of active migrants wanting to stay abroad permanently, which is a significant difference compared to 19% of potential migrants. Return migration is expected by 54% of potential migrants and 50% of active migrants, but there is a significant difference in the length of stay abroad before the expected return. 42% of active migrants expect to return after more than 5 years, compared to 7% of potential migrants.

6.5 Motives for leaving

We next explored motives for leaving, where respondents were offered 15 different options, (including an "other" option) while evaluating the importance of any presented option (all options were rated on a five-point rating scale, ranging between 1 being completely

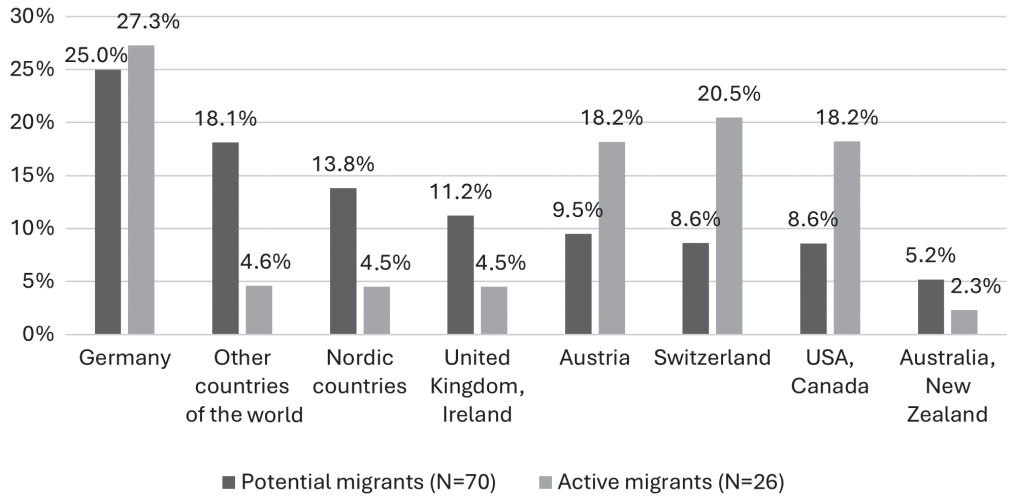

Fig. 3 Final destinations (%).
Note: Total N = 159; Potential migrants N = 70; Active migrants N = 26; based on the question: "To which country are you most likely to go? (Only one field needs to be filled in, i.e. country. If you do not know yet, leave the fields blank)."
Source: own research (2022).

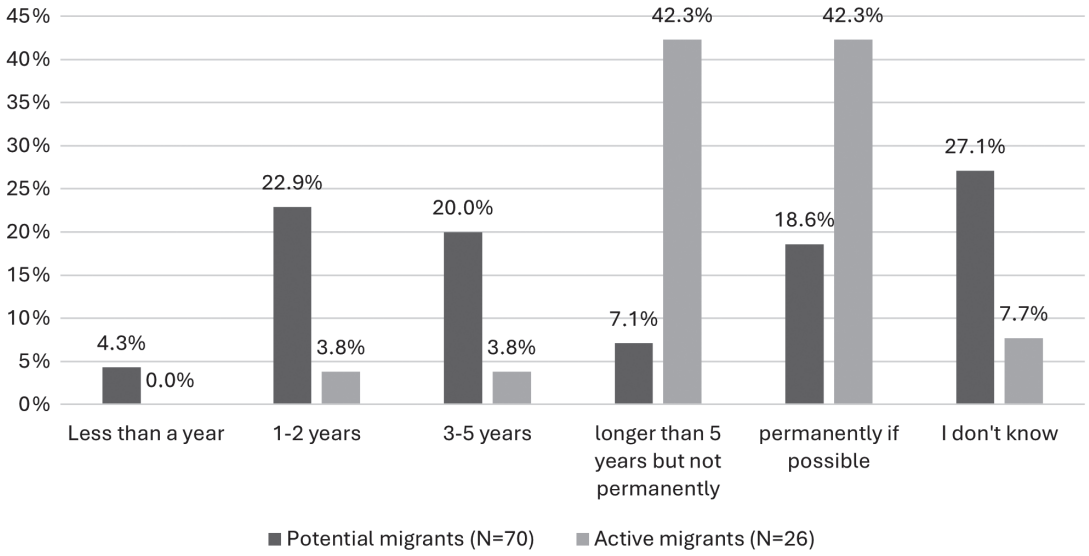

Fig. 4 Planned length of stay abroad (%).
Note: Potential migrants N = 70; Active migrants N = 26; based on the question: "How long are you likely to stay abroad?" For available options, see more in the table.
Source: own research (2022).

unimportant and 5 being completely important). An arithmetic mean was used in the evaluation, which was calculated for each motive separately. Across all 96 potential migrants combined, medics placed the greatest importance on gaining international insight and contacts. The other two important factors are higher financial remuneration and better working conditions. Focusing on potential and active migrants separately (Tab. 2), we found that for active migrants, better working conditions are more important, while for potential migrants the most important motive is to gain international insight. Both groups consider a higher financial reward to be a highly important motive. By contrast, whereas the motive of improving knowledge of a foreign language is ranked very high by potential migrants, for active migrants this motive is one of the least important (they already know the language well).

6.6 Factors behind medics' migration plan

The likelihood or risk of migration of medics to work abroad was analysed using binary logistic regression. Tab. 3 shows the fully adjusted odds ratios (Odds ratio = OR) as the output of the model at 95% confidence level (95% Confidence Interval = 95% CI).

All variables were entered into the model simultaneously. The dependent variable was the probability of movement, based on the question: "Do you expect to work as a doctor abroad at some point after

Tab. 2 Individual motives for going abroad to work.

N = 96	Potential migrants N = 70	Active migrants N = 26
Gaining international insight and contacts	4.07	3.85
Higher financial remuneration	3.86	4.00
Improvement of foreign language	3.80	2.58
Better working conditions	3.67	4.15
Increased opportunity for career growth in Czechia after returning from abroad	3.56	2.92
Better quality of postgraduate education	3.50	3.77
Work in a renowned medical facility	3.44	2.81
Opportunity to work with cutting-edge technology	3.43	3.23
Higher opportunity for career growth abroad	3.27	2.85
Higher level of healthcare in the destination country	3.26	3.46
Learning about a different cultural environment	3.24	2.77
Become independent	3.19	2.58
More opportunities to work in your specialised field	3.00	2.69
Geographical proximity of the destination country to the home country	2.51	2.12

Note: Min. = 1.00, Max. = 5.00; based on the question: "Please indicate how important motivation to work abroad is to you and rate the motives" (1 means completely unimportant and 5 means completely important) – For available options see more in the table.
Source: own research (2022).

completing your current studies?", which was measured in our study on a five-point scale ranging from "definitely yes" to "definitely no". This variable was dichotomized as "I plan to migrate" ("definitely yes", "rather yes") and "I do not plan to migrate" ("definitely no", "rather no"). We did not include the answer "don't know" in either variable and considered them as missing values. The variables gender, year of the study, faculty, previous work or study experience in the last few years abroad, and knowledge of English and German language were included in the analysis as independent variables. 336 respondents out of a total sample of 397 were included in the analysis. Nagelkerk's R Square, is equal to 0.297, which can be considered as a fairly competent (but not very high) ability of the model to explain the given reality.

The results show that there was no statistically significant relationship between the variables faculty, year and gender and the plan to go abroad. In the case of gender, where we chose women as the reference category, men are 1.3 times more likely (OR = 1.323; 95% CI 0.733–2.387) to go abroad for work than women. Within year groups, concerning the migration abroad for work, both Year 5 and Year 4 were equally 1.2 times more likely to migrate (OR = 1.233; 95% CI 0.621–2.446 and OR = 1.158; 95% CI 0.577–2.326, respectively) than Year 6, which was defined as the reference category. As for faculties, medics from the Faculty of Medicine of the Charles University in Hradec Králové were 2.7 times more likely (OR = 2.736; 95% CI 0.854–8.765) to go abroad for work than medics from the 1st Faculty of Medicine of the Charles University in Prague, which was the reference category.

In each of the variables describing previous work or study experience from abroad and the level of English and German language proficiency, some categories were detected as statistically significant in relation to the plan to migrate abroad for work. If a medical student had study or work experience abroad in previous years, he/she is 2.7 times more likely (OR = 2.680; 95% CI 1.276–5.627) to migrate for work abroad than those who do not have this experience. According to our model, a higher English language level plays no role in the decision to pursue migration. The opposite is true for the German language, where the higher the level of proficiency, the more likely it is to implement a plan to go abroad for work; for example, if a medical student knows German at C1 level, he/she is 19.5 times more likely to migrate (OR = 19.504; 95% CI 5.181–73.424) than one who does not know it at all.

6.7 Factors hindering migration

Barriers to medics going abroad to work were measured via using the question, "If you do not plan to go abroad to work, please indicate how important each of the factors that prevent you from doing so are to you." Medics rated each factor on a five-point scale from not at all important to very important. To better understand the variables analyzed, factor analysis was used where factor extraction was performed using the Principal components method, the result of which showed us three factors capturing 57% of the total variability. Based on the representation of each variable in the newly extracted factors, we found that

Tab. 3 Regression analysis – adjusted odds ratios (OR) and 95% confidence interval for finding the probability of migration.

Dependent variable: 1 = has got plans to migrate; 0 = has not got plans to migrate	N = 336		
Independent variables	Adjusted odds ratios (OR)	95% confidence interval	
		Lower	Upper
Females – REF	1		
Males	1.323	0.733	2.387
6th year – REF	1		
5th year	1.233	0.621	2.326
4th year	1.158	0.577	2.326
Experience abroad – no – REF	1		
Experience abroad – yes	**2.680**	**1.276**	**5.627**
1st Medical Faculty of Charles University in Prague – REF	1		
3rd Medical Faculty of Charles University in Prague	0.862	0.440	1.691
Faculty of Medicine of Charles University in Pilsen	0.940	0.456	1.938
Faculty of Medicine of Charles University in Hradec Králové	2.736	0.854	8.765
English language – A1 – REF	1		
English language – A2	0.080	0.003	2.531
English language – B1	**0.063**	**0.004**	**0.912**
English language – B2	0.097	0.008	1.206
English language – C1	0.261	0.021	3.218
English language – C2	0.621	0.046	8.477
German language – Does not know – REF	1		
German language – A1	2.033	0.846	4.882
German language – A2	**2.678**	**1.122**	**6.396**
German language – B1	1.753	0.745	4.124
German language – B2	**5.010**	**1.897**	**13.235**
German language – C1	**19.504**	**5.181**	**73.424**
German language – C2	14.146	0.796	251.528

Note: Bold when p <0.05, REF = reference category.
Source: own research (2022).

the most information was retained in the variable of separation from family and friends (72%). On the other hand, the least information was retained in the variables of partner disapproval (31%).

Tab. 4 shows us the factor loadings. These factors give us the degree of correlation between the original and newly created variables. Based on the rotated matrix of factor loadings with respect to the variables saturated by the aforementioned factors characterizing the barriers to the migration movement of medical professionals, we chose to name them as follows:

- Factor 1: Psychological-administrative barrier.
- Factor 2: Social barrier.
- Factor 3: Professional barrier.

As part of the analysis, we created individual scores for each variable based on the factor score matrix. This shows us how each socio-demographic factor corresponds to each factor.

The psychological-administrative barrier is mainly related to self-esteem and the psychological burden that is exerted on medics. The social barrier, which plays the most important role means that medics are concerned about the lack of social contact with their family and close friends. Both of these factors are particularly connected to women. The professional barrier means that medics do not feel the need to go abroad to work because they are convinced that they will find a very good job in their field in Czechia. This factor corresponds mainly with men.

6.8 Influence of institutional actors vs family/ personal actors

We also investigated the role of institutions vs. family and other personal networks in the potential migration movement of medics, i.e., which actors medics intend to use to gain employment opportunities or who may be instrumental in their eventual integration in the destination country. We first focused on the interpersonal ties that might link potential migrants

Tab. 4 Rotated matrix of factor loadings.

	Factor		
	1	2	3
Comparative exam in some countries	0.775		
Doubts about the fulfilment of professional requirements in a given country	0.718		−0.209
Problems with attestation examinations	0.711		0.247
High costs associated with living abroad	0.662		0.258
Excessive paperwork and difficulty in dealing with various documents before departure	0.606		
Fear of language problems / I don't speak the language	0.492	0.289	−0.475
Separation from family and friends		0.851	
Loneliness and lack of social contacts	0.295	0.754	
Partner's disapproval		0.553	
Assumption of a good job in Czechia			0.819

Note: Extraction method: Principal components; the rotation method: Varimax (5 iterations).
Source: own research (2022).

Tab. 5 Importance of actors in getting a job abroad.

N = 96	Potential migrants N = 70	Active migrants N = 26
Internet sites for searching for job opportunities	3.20	3.31
Compatriot community	2.84	2.62
Family relatives in the destination country	2.74	2.77
Acquaintances from the country of origin	2.73	2.31
Family relatives from the country of origin	2.73	2.73
Chamber of Medicine in the country of destination	2.73	2.15
Specialised job placement agencies	2.69	2.19
Other NGOs in the destination country	2.61	2.27
Medical chamber from the country of origin	2.56	1.85
Acquaintances of my family in the destination country	2.47	2.42

Note: Min. = 1.00, Max. = 5.00; based on the question: "Please indicate how important the following actors would be for you in getting a job." (1 means completely unimportant and 5 means completely important) – For available options see more in the table.
Source: own research (2022).

to their possible human networks abroad. The results across 96 potential migrants illustrate that 38% of medics have some ties – acquaintances, friends or family members who live abroad.

When asked about the importance of these actors, respondents were presented with 10 different options (including an "other" option). They rated answers on a five-point scale, with 1 being completely unimportant and 5 being completely important and an arithmetic mean was used in the evaluation.

First, we will focus on the actors that medics intend to use to make use of job opportunities in the target country (Tab. 5).

Potential and active migrants perceive institutions as less important than human relations networks, except for job search websites, which are perceived as the most important within both groups, with values over 3.00. Potential migrants then perceive the medical chamber in the destination country as an important actor, and we see that it is on par with most family and other personal relationships. The differences in weights between actors within groups are minimal.

Next, we look at the importance of institutions or family and other personal networks in the potential integration in the destination country.

In Tab. 6, which also divides the set into potential and active migrants, we can see that the first two most important actors are self-initiated (own initiative) and the future employer. Potential migrants attach more importance to institutions, where the help of other institutions and programs besides the future employer is provided. Weak ties seem to be slightly more important for potential migrants, where

Tab. 6 Importance of actors at the beginning of the possible integration in the destination country abroad.

N = 96	Potential migrants N = 70	Active migrants N = 26
Own initiative	3.90	3.92
Future employer	3.36	3.50
Acquaintances from the country of origin	3.10	2.54
My acquaintance from the destination country	3.09	2.88
Help from other institutions and programmes	3.00	2.69
Family relatives in the destination country	2.93	3.19
Compatriot community	2.86	2.81
Chamber of medicine in the country of destination	2.71	2.19
Family relatives from the country of origin	2.64	2.73
Various non-profit organisations	2.31	1.88

Note: Min. = 1.00, Max. = 5.00; based on the question: "Please indicate how important the following actors would be for you in the beginning of your integration in the destination country abroad." (1 means completely unimportant and 5 means completely important) – For available options see more in the table.
Source: own research (2022).

mainly acquaintances from the country of origin and acquaintances from the country of destination dominate. Networks seem to be more important for active migrants, where a slight dominance of strong ties is seen, specifically family relatives in the destination country. Various non-profit organizations and the

medical chamber in the destination country are perceived as the least important in both groups.

7. Discussion

The quality of the Czech healthcare system is relatively high, but it faces several serious challenges. These include, for example, the aging medical workforce, a lack of the most advanced modern equipment, overwork and overtime, a heavy administrative and bureaucratic burden on doctors, complicated specialization/attestation process, and comparatively lower salaries - especially in relation to wealthier EU countries. These issues contribute to growing dissatisfaction among medical staff, occasionally culminating in nationwide protests. This overall discontent can, and sometimes does, result in international migration, particularly among younger doctors.

Our research has helped to shed light on some important aspects behind the potential threat of increased emigration of medical students from Czechia. The study confirmed a fairly wide range of reasons underlying the declared preference for emigration (among active migrants), which correspond directly to the previously mentioned "push" factors – further underlining the importance of this finding. These include the migration appeal of destination countries, which offer not only higher individual rewards for doctors' work, but also gaining international insight and contacts, and superior quality of structural and institutional attributes – such as better working conditions, better quality of postgraduate education, and opportunities to work with cutting-edge technology. In summary, the desire for a higher salary was important, but the significance of other structural attributes was equally evident. In this respect, Czechia resembles several other Central and Eastern European countries (e.g. Poland – Krajewski-Siuda et al. 2012; Croatia – Bojanic et al. 2015; and Romania – Suciu et al. 2017).

Compared to a similar study from 2006 (Vavrečková et al. 2006), our findings confirm the important and growing role of German language proficiency, which is closely linked to respondents' preference for migration to German-speaking countries – especially Germany, Austria, and Switzerland. Conversely, the importance of Ireland and the United Kingdom as destination countries appears to have declined significantly, likely due to Brexit – particularly the end of free movement and the accompanying administrative and bureaucratic burdens.

As expected, social networks emerged as a very important factor, taking many different forms among both potential and active migrants. (By the way, an important deterrent to potential emigration is the separation from family, along with all the related emotional and practical implications – see also Vavrečková et al. 2006). No significant differences were found in the preferences for support from so-called strong versus weak ties (in Granovetter's 1973 terms). Compared to the role of institutional actors, social networks did not appear to be either dominant or insignificant. To reach more substantial conclusions in this area, it would be necessary to gain deeper insight into the essence of both of these important factors through more detailed research.

An important perspective in the analysis of the situation is brought by economic concepts of migration. Constant and Massey (2002) highlight that neoclassical economics and the new economics of labor migration propose differing perspectives on both migration duration and motivation. The neoclassical approach aligns more closely with the behavior of "our active migrants" – those intending to stay abroad permanently or return only after more than five years – who are primarily motivated by profit maximization.

On the other hand, the new economics of labour migration in our case aligns more closely with the motivations of our "potential migrants" – those considering temporary migration - most of whom intend to return within five years. This group uses migration as a strategy to overcome market failures in their home country. In addition to higher financial rewards, they seek to gain an international perspective, improve their foreign language skills, and pursue better postgraduate education. These motivations are ultimately framed by their higher expectations for career advancement in Czechia upon their eventual return from abroad.

Although the migration of young doctors from Czechia to other countries does not currently pose a critical threat to the functioning of the healthcare system, it remains a latent issue. This problem could escalate rapidly, particularly in response to the growing global demand to strengthen healthcare systems in many developed countries within the EU and beyond, or due to worsening conditions within Czechia itself.

The first priority should be to stabilize the domestic medical workforce by improving working conditions – specifically through better salaries, modernized equipment, reduced bureaucratic burdens, and an overall decrease in workload. Equally important is encouraging Czech doctors abroad to return, bringing with them valuable social remittances such as new professional experiences and related know-how (e.g. Drbohlav and Dzúrová 2023).

To achieve these goals, a range of targeted recruitment programs must be developed (e.g. Kostelecký et al. 2008). In addition, further research into both the potential and actual migration of doctors is essential to addressing these urgent practical challenges.

8. Conclusions

Below, we summarize the main findings by addressing the research questions:

The findings suggest that the outflow of doctors seeking employment abroad is probably not large or significant enough to seriously impact the Czech healthcare system. Specifically, 17% were identified as "potential" migrants, while only 7% were classified as "actual" migrants.

For potential migrants – and overall – the most influential factor was the opportunity to gain an international perspective and build professional contacts. In contrast, for active migrants, better working conditions were the primary motivator.

We assumed that the majority of future doctors would undertake only temporary work stays abroad, leading primarily to return migration – an assumption that was confirmed by our analysis. Most potential and active migrants expect to eventually return to their home country. However, notable differences between potential and active migrants emerged and should be taken into consideration. The analysis suggests that social ties are often more influential in helping medical professionals secure employment abroad. On the other hand, when it comes to integration, it appears that medical professionals tend to rely more heavily on institutional actors (Massey et al. 1993). Furthermore, the influence of strong and weak ties, as defined by Granovetter (1973), was demonstrated. The results of this analysis confirmed that, overall, it is difficult to clearly determine which type of tie holds greater significance. However, strong ties appear to play a more important role for "active migrants" – those who are firmly committed to migration. In contrast, weak ties seem to exert greater influence among "potential migrants".

Germany plays a key role across the entire research sample, as well as within both respondent groups (potential and active migrants). In addition to Germany, potential migrants also show a preference – albeit to a lesser extent – for "other countries of the world" and the Nordic countries. Among active migrants, Germany remains a top destination, alongside Switzerland, Austria, and the USA/Canada, which are also considered highly attractive migration choices.

A more nuanced perspective on the issue is provided by the results of the regression analysis. These results indicate that having work or study experience abroad, as well as proficiency in the German language, significantly increases the likelihood of declaring plans to emigrate in the future. In contrast, no significant relationships were found between emigration intentions and factors such as gender, academic year, or the specific faculty where respondents studied.

The most important factor discouraging future doctors from working abroad is the prospect of being separated from family and friends – a social barrier. Other key deterrents include concerns about insufficient language skills (a psychological-administrative barrier) and the belief that they will be able to secure a very good job within Czechia (a professional barrier).

This research has its limitations. The sample of participating General Medicine students, although relatively large and drawn from the country's largest university, is limited to four faculties of Charles University and therefore does not represent a nationwide perspective. Second, differences across medical specialties were not captured, and the absence of qualitative data prevents deeper insight into individual motivations and strategies. Furthermore, the migration intentions of young physicians may also change over time due to professional and personal circumstances.

Future research should combine larger, more complex surveys with qualitative approaches to improve our understanding of specialty-specific patterns and the institutional, familial and social factors that influence physicians' behaviour and migration.

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