

# **Utilization of health care services by migrants in Europe - a systematic literature review**

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Short title: Utilization of health care services by migrants

# Utilization of health care services by migrants in Europe - a systematic literature review

## Abstract

**Introduction:** Our study reviewed the empirical evidence on the utilization of health care services by migrants in Europe, and to identify differences in health service utilization between migrants and non-migrants across European countries.

**Sources of data:** A systematic literature review was performed, searching the databases Medline, Cinahl and Embase and covering the period from January 2009 to April 2016. The final number of articles included was 39.

**Areas of agreement:** Utilization of accident and emergency services and hospitalizations were higher among migrants compared to non-migrants in most countries for which evidence was available. In contrast, screening and outpatient visits for specialized care were generally used less often by migrants.

**Areas of controversy:** Utilization of general practitioner services among migrants compared to non-migrants presents a diverging picture.

**Growing points:** Compared to previous systematic reviews, the results indicate a clearer picture of the differences in health service utilization between migrants and non-migrants in Europe.

**Areas timely for developing research:** A comprehensive comparison across European countries is impossible because the number of studies is still limited. Further research should also help to identify barriers regarding the utilization of health care services by EU migrants.

**Key words:** migrants, Europe, health care, service utilization, systematic review

## **Introduction**

In 2015, approximately 53.8 million migrants were estimated to live in the European Union (EU), amounting to 10.4% of its population (1). A migrant is defined by Eurostat as a person who lives temporarily or permanently outside of his/her country of origin (1). Of the total number of migrants in the EU, 34.3 million were born outside the EU-28, and 18.5 million were born in an EU member state different from the one in which they lived (1).

One of the biggest challenges migrants face in their host countries is to obtain access to health services (2). Although the human right to health has been set out in the 1948 Constitution of the World Health Organization (WHO), as well as in subsequent international legal documents, in practice migrants often face formal and informal barriers in accessing health services. This includes legal and administrative hurdles but also a failure of some health systems to accommodate diversity and provide information to migrants on how the system works (3). In all these respects, countries in Europe display substantial variability. Beliefs about the need for health services, based on migrants' experience in their country of origin, might also affect their pattern of health service utilization. Against this background and the growing number of migrants in Europe, the utilization of health services by migrants has become an important topic of interest.

Does the utilization of health care services by migrants in Europe differ from that of non-migrants? This question has been addressed by a number of studies, including a systematic literature review by Norredam et al. (2009) (4). This previous systematic review focussed on the utilization of somatic health care services in Europe and concluded that, for those countries for which information was available, migrants and non-migrants showed disparities in terms of utilization. However, across countries there was a diverging picture, with indecisive conclusions on health care utilization by migrants, as well as difficulties in comparing findings across countries.

Our new systematic review aimed to scrutinize whether utilization patterns have changed in the years since 2009. It thus complements the previous systematic review, which covered from the period 1999-2009.

## **Methods**

We conducted the literature search in April 2016. The objective was to find articles that were: (i) published in English, (ii) concerned with humans, (iii) covering subjects which were at

least 19 years old, and (iv) were published in 2009 or later. Relevant publications were identified by searching the databases Medline, Embase and Cinahl. We also checked the reference lists of articles that met the inclusion criteria. The review was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (5). A librarian was consulted to review the search strategy.

Our inclusion criteria were similar to those used by the previous study (Norredam et al.2009) (4). Articles were included when reported to be original, peer reviewed and based on quantitative studies. We included articles published since 2009 in English. Only studies conducted in EU-28 and European Free Trade countries were taken into consideration. Furthermore, only adult utilization of screening, general practitioners (GPs), hospitalization, outpatient specialist doctors and accident and emergency (A&E) services were included. Relevant articles had to clearly indicate that the migrants and non-migrants considered were residing in the same country and that non-migrants were serving as the reference group. We excluded studies related to specific conditions, e.g. maternal health, diseases such as HIV or hepatitis, specific parts of health system (dental care or physiotherapy) or the use of pharmaceuticals. We also excluded articles related to treatment adherence, outcomes or the stage of diagnosis, since the focus was on the utilization of services and not on their follow-up. We further excluded studies on asylum-seekers or undocumented migrants because of their special legal situation and the well-documented barriers in health service utilization they face, which make comparisons with non-migrants difficult. Finally, we excluded articles only focusing on mental health services, as well as articles covering age groups below 19 years.

The initial search was conducted in Medline and included the following Mesh and free text search terms with truncations which were connected with the Boolean operators OR and AND:

*[exp "Transients and Migrants"/ (Mesh) OR exp "Emigrants and Immigrants"/ (Mesh) OR exp "Emigration and Immigration"/ (Mesh) OR (migra\* or emigra\* or immigra\*)] AND [exp Health Services Accessibility/ (Mesh) OR exp "Patient Acceptance of Health Care"/ (Mesh) OR (utilization or usage) AND exp Diagnosis/ (Mesh) OR exp General Practitioners/ (Mesh) OR exp Primary Health Care/ (Mesh) OR exp Emergency Medical Services/ (Mesh) OR exp Emergency Service, Hospital/ (Mesh) OR exp Hospitals/ (Mesh) OR exp Hospitalization/ (Mesh) OR exp Ambulatory Care/ (Mesh) OR exp Health Status/ (Mesh) OR exp Preventive Health Services/ (Mesh) OR exp "Health Services Needs and Demand"/ (Mesh) OR (health care service\* or healthcare service\* or health service\* or primary care) OR (emergency\* or clinic\* or hospital\* or medical care or accident or A&E or speciali\*)] AND [exp Europe/ (Mesh) OR exp European Union/ (Mesh) OR (Iceland or Norway or Liechtenstein or Switzerland) OR*

*(Austria or Belgium or Bulgaria or Croatia or Cyprus or Czech Republic or Denmark or Estonia or Finland or France or Germany or Greece or Hungary or Ireland or Italy or Latvia or Lithuania or Luxembourg or Malta or Netherlands or Poland or Slovakia or Slovenia or Spain or Sweden or United Kingdom or UK or England or Scotland or Wales or Northern Ireland or Portugal or Romania or Euro\*)].*

The search was then extended to cover the EMBASE and CINAHL databases.

Based on the pre-defined inclusion and exclusion criteria, the lead author made the initial selection of articles based on title and abstract, while two co-authors selected articles independently. Studies were included when all three researchers agreed that relevant inclusion criteria were met. This was then followed by a full text scan. Moreover, the reference lists of included studies were checked to identify additional relevant studies that meet the inclusion criteria. Relevant information was extracted and synthesized based on the method of qualitative content analysis.

The quality of included articles was assessed using a standardized quality assessment tool (6). The quality of our systematic review was ensured using the PRISMA 2009 checklist (5) (Appendix 1).

## **Results**

The literature search resulted in a total of 2041 articles (354 in Medline, 1590 in EMBASE and 97 in CINAHL), as shown in Figure 1.

In total, 39 articles were included in the final selection. Characteristics of the included studies are shown in Table 1. The included studies were conducted in Spain (n=14); Norway (n=7); Denmark (n=4); the Netherlands (n=4); Italy (n=3); Sweden (n=2); Germany (n=2); Greece (n=1), the Czech Republic (n=1) and one study reported a multi-country analysis (n=1). Topic-wise, 16 studies provided information on the utilization of GP services, 14 studies covered screening, and 13 studies examined the use of accident and emergency (A&E) services, while hospitalization and outpatient specialist services were covered in 10 studies each. However, several articles covered more than one topic.

The migrant population samples used in the different studies vary from only 21 to as much as 445,547 migrants; 7 articles report a sample size of up to 1,000 migrants, 30 articles report a sample size of more than 1,000 migrants and two articles do not specify the sample size at all. Information on migrants' place of birth was given as either the country of birth (n=13), region of birth (n=16) or a combination of both (n=2). Moreover, eight studies did not provide

any information on migrants' place of birth. The majority of the studies (n=32) did not give any information on the reason for migration (e.g. family reunification or labour migration).

Studies used both registry data (n=21) and survey data (n=17) as a source of information, and one study used a combination of both. More than half of all studies (56%) were carried out at the national level, 16 studies were undertaken at the regional or local level, and one study did not specify its geographic coverage.

Most study designs were cross-sectional (n=29), while a few were registry-studies (n=4). Retrospective observational, cohort studies or feasibility studies were less commonly used. Defined adjustments, such as for age, gender or socio-economic status, were found in 85% of all studies; some studies (n=6) did not have health care utilization by migrants as their primary focus, but instead covered a broader sample of the population and included migrant status only as one indicator among many.

The articles included in the review and their key findings are presented in Appendix 2, based on the type of service utilized. A summary of the main findings is given in Table 2.

[Figure 1 about here]

[Table 1 about here]

### ***General practitioner services***

Data on GP service utilization show a diverging picture between studies and countries. Almost half of the studies on GP services indicate that the number of GP visits is higher among migrants compared to the native population (7-13). Some studies in Spain and Norway found that migrants attend GP practices more frequently, especially migrants from low-income countries (8, 12, 13, 14). In Spain, patients from Maghreb, the rest of Africa and Latin American countries are reported to request GP consultations more frequently than natives once migrants visited the GP for the first time (10).

In contrast, fewer GP visits by migrants compared to natives were found in several studies in Spain, the Netherlands, Norway and the Czech Republic (15-20), although these studies do not discuss whether migrants might bypass GP services and directly use hospital care.

Two studies, from Italy and Spain, report no substantive difference in GP service use between migrants and non-migrants (22, 23).

A number of reasons are given in the studies for higher or lower utilization of GP services. A few studies in Spain and Norway suggest that migrants had a better self-reported health status than natives (17, 18), due to the so-called 'healthy migrant effect' (21), with a resulting lower need for GP services. In contrast, potential organizational barriers or cultural factors were reported to hinder the proper utilization of GP services in the Czech Republic, Spain and Norway (16, 18, 20). A study from Spain points to existing inequities in seeking initial contact with a GP (15). In a Dutch study, lower use of GP services use has been found in the migrant population from the Moluccan island of Indonesia, which has been attributed to low health literacy in this group (19). As regards reasons for higher utilization of GP services, a German study mentions difficulties in accessing secondary care by migrants due to lower socio-economic status, education or household income, with a resulting higher use of primary care in the form of GP visits (11).

### ***Hospitalization***

Findings on hospitalization are mixed. Some studies, from Spain, Norway, Germany and Italy, found that most migrant groups have a higher utilization of hospital services than natives (7, 11, 15, 24, 25). A study from the Netherlands indicates that, for age groups >45 years, there was a 24% higher chance for Turkish and an 11% higher chance for Surinamese patients to be hospitalized in an unplanned re-admission than for natives (25). In a study in Italy, migrants from Morocco, Turkey, the Antilles and Surinam who were hospitalized were found to have, on average, a longer length of stay of at least three days, which might be partly explained by socio-economic indicators (24).

Two studies, in the Czech Republic and Spain (16, 26), show opposing findings. The Czech study indicates lower hospitalization rates for migrants from Ukraine and attributes this to potential organizational barriers, especially for holders of long/term visas (as opposed to permanent visas) (16). Differences in migrants and non-migrant groups' hospitalization are not found to be statistically significant in neither of these two studies.

### ***Outpatient specialist services***

Only three studies, from Denmark, Spain and Norway, present data indicating a higher utilization of outpatient specialist services by migrants compared to natives (7, 10, 27). In Denmark, Neergaard et al. (2013) found that being a migrant is a positive predictor for the utilization of specialist care (27). In this study, migration was just one adjusted indicator among many others. The study from Norway suggests that migrants might have adequate knowledge of health services and how to use them, and that this might explain the higher numbers in the utilization of outpatient specialist services (7).

Twice as many studies, from Spain, the Czech Republic, Italy and Germany, indicate the opposite, namely a much lower utilization of outpatient specialist services by migrants compared to natives (11, 15-17, 22, 23). They attribute this to barriers for migrants in accessing specialized care in these countries. Barriers can either be organizational (16), linked to a failure to accommodate cultural diversity (11) or lacking access to health care (17). One Italian study found even lower consultations with specialists when using a telephone system, due to potential language barriers (23). Hernandez et al. (2009) explain the low utilization of outpatient specialist services among migrants with the higher use of emergency services as a substitute for specialized care (15).

One study in Spain shows no difference in utilization of specialist services between migrants and non-migrants (8). Another Spanish study, on visits to a specialist by women and men, found that male migrants had less frequent visits to specialists than natives (22).

### ***Accident and emergency services***

Results on A&E services show a higher utilization by migrants than by non-migrants in most countries for which data were available. As reported in Italy and Spain (15, 23), A&E services can provide a substitute for hospital services, as it is easier to access these services. Studies in Spain and Norway describe that, apart from easier access, the lack of knowledge of the correct use of emergency services also contributes to their overutilization, especially where language barriers exist (28, 29). In Italy, poorer health, lower socio-economic status or a less healthy diet were found to be predisposing factors for migrants to use A&E services more frequently than natives (2).

Lower A&E visits among migrants were reported in the Czech Republic, which was attributed to organizational barriers (16). In Norway, both higher and lower utilization rates among migrants were found. The registry-based study of Sandvick and Diaz (2012), states that immigrants in Norway used A&E services less than natives (40). When comparing both studies from Norway (28,40) two different outcomes were described. The study by Ruud et al. (2015) provides evidence that migrants, especially patients from Sweden, Pakistan and Somalia, report more visits to A&E services than non-migrants ( $p < 0.001$ ) (28), whereas Sandvik and Diaz (2012) describe the opposite (40).

In Spain, two studies did not detect any significant differences in utilization of A&E services between migrants and non-migrants (8,22).

### ***Screening***

Findings on screening show the clearest results from all health service categories considered, with analysed screening procedures ranging from breast cancer screening



(mammography), cervical cancer screening (cervical cytology), abdominal aortic aneurysm screening, to colorectal cancer screening.

All studies (31,32,33,34,37,42,43,44,45,46,47,48,49), except for one in Germany (30), indicate a significantly lower utilization of screening services among migrants compared to natives. The German study that found higher, not lower, participation of Turkish migrants in breast cancer screening programmes emphasizes that these findings are unexpected and not consistent with other European results (30).

All other studies (31,32,33,34,37,42,43,44,45,46,47,48,49), from Spain, Sweden, Germany, Denmark, Greece and the Netherlands, describe a significantly lower participation in screening services by migrants.

In a study on cervical cancer screening in Spain, for example, coverage of second-round screening (inviting participants with an initial negative result to an additional screening after a pre-defined time interval of several years) for migrant women was only 43.1%, compared to 50.7% in natives (34). Frederiksen et al. (2010) report that participation in colorectal cancer screening was almost half as frequent in migrants compared to native Danes (49).

A number of reasons are given as potential explanations for low screening update among migrants, including lack of education concerning adequate screening practices and even lack of screening tests for migrants (31-33). Other factors identified include low socio-economic status, lack of health insurance, as well as socio-demographic or linguistic problems.

### ***Results of the quality check***

We assessed the quality of included studies using a standardized quality assessment tool from the National Heart, Lung and Blood Institute (NHLBI) (6). The outcomes of the quality rankings in the assessment tool are predefined as 'good', 'fair' or 'poor'. After assessing all studies (n=39) with the 14-item questionnaire, only 9 studies (10, 11, 14, 19, 26-28, 30, 34) achieved scores which were associated with a 'fair' to 'good' quality rating, based on the guidance provided by NHLBI, the remaining 30 studies received a 'good' ranking. Those 9 studies fail to provide clear definitions of dependent and independent variables, as well as of exposure measurements. The 30 other studies provided clear information about the items on the check list, such as sample size, clearly stated research objectives, participation rate or study selection. As the majority of scores for the quality assessment were ranked as 'good' and a few with 'fair' quality, all 39 studies were included in the results section and to draw conclusions.

[Table 2 about here]

## Discussion

The studies identified through our systematic review present, for most countries, either higher or lower utilization patterns among migrants, depending on the type of health service used. The picture is most diverse with regard to the utilization of GP services, where migrants were found to have higher utilization rates than non-migrants in some studies and countries and lower rates in others. For hospitalization and A&E services, migrants exhibit a longer length of stay and a higher number of visits than non-migrants in most studies and countries. In terms of outpatient specialized care, the non-migrant group is found to use services more often than migrants, although the opposite is also reported. The clearest results emerge with regard to screening. All articles examining the utilization of screening services by migrants compared to non-migrants, except for one (30), found a significantly lower participation by the migrant population.

The generally lower use of non-urgent outpatient specialist services and in particular of screening services by migrants indicates the existence of barriers in accessing these services. These could be the result of several factors, including organizational issues, language barriers, lacking health literacy, lacking knowledge about the availability and benefits of services, and a failure to accommodate cultural differences (10, 16).

However, higher use of non-urgent outpatient specialist services by migrants is also reported in some articles. Reasons for this could include migrants' experience in their countries of origin, where primary care may be of poor quality, gate-keeping systems non-existing and specialist services accessed directly. However, in the new host countries where GPs act as a gatekeeper between the patient and the specialist (like in the Netherlands), a specialist doctor cannot be approached directly by the patient, unless the patients pay an additional fee (35). In this case, migrants who avoid GP services might either not visit a specialist at all or try to use specialized emergency care if provided free of charge. This can be an explanation for the lower use of specialist visits in some countries (35). Thus, differences in GP gate-keeping and co-payment obligations across countries could result in different health care use of specialized care by migrants. However, it is difficult to draw firm conclusions on this issue because many studies of the use of specialist services do not discuss the possible bypassing of GP services.

Although studies on the utilization of outpatient specialist services point in different directions, they identify similar reasons for different utilization patterns, be they higher or lower. Challenges include complex organizational tasks such as a high amount of paperwork or coordination of appointments with work obligations, multiple visits by migrants to regional administrations which could be very time consuming, as well as lack of health insurance or ability to pay. The lack of interpreters might also hinder migrants to adequately present their health issues and telephone consultations could be impossible if the language gap is too wide (23, 28, 37). Several articles also mention that migrants do not recognize a disease (19) or fail to use services due to fear, time pressure or lacking knowledge on potential risks to their health (38).

A&E services and inpatient hospital services tend to be more frequently used by migrants in most of the countries for which data are available. Possible reasons include a worse health status and a lower utilization of primary care (see above). However, it could also indicate that migrants bypass GP services and access A&E services and hospitals directly. This is viewed by some as an overutilization of services, resulting in higher costs when compared to accessing primary care (2, 28, 29). Several studies in Germany suggest that cultural differences or different health behaviours (7, 11) could lead to an increased disease prevalence among migrants or a longer duration of untreated illness, which worsens the severity of conditions and results in longer hospitalizations (24). The generally higher utilization of A&E services by migrants, however, could also be due to the fact that some European countries provide emergency care free of charge (without any type of co-payment for the patient), which makes these services more affordable (39). As mentioned above, if migrants bypass GP services but cannot access non-urgent specialist services because they need a GP referral or have to pay, they might try to obtain specialist care through A&E departments if provided free of charge. Although this explanation is plausible, it is not well supported by the studies reviewed, as they do not explicitly account for possible GP bypass by migrants. Nevertheless, Greece, Italy and Spain do not have any kind of co-payment schemes for emergency care and 18 studies included in this review that show a higher use of emergency care by migrants are from these three countries.

As mentioned above, this systematic review was designed based on the previous review on this topic by Norredam et al. (2009) (4). The findings of the two reviews show some similarities and differences. The original study by Norredam et al. (2009) (4) included 21 articles in the review, whereas this study identified 39 relevant articles for inclusion. Our study took findings from 9 different European countries into account, whereas the original review only gathered data from 6 countries. The majority of articles in our study were conducted in Spain (36%), whereas in the original study by Norredam et al. (2009) (4)

articles from Spain accounted for only 10%. The original review had the most articles from the UK and the Netherlands (each 29%), whereas our review could not identify any article about the UK and only 10% of articles were concerned with the Netherlands. However, it is clear that available data are still limited, as the number of countries is not covering the whole of Europe.

The findings from the two reviews also differ. Whereas more GP contacts by migrants were reported by Norredam et al. (2009) (4), our review shows a much more diverse picture. With regard to outpatient specialist services, the same or higher levels of utilization by migrants were found by Norredam et al. (2009) (4), while our review indicates both lower and higher utilization, depending on country and study. Utilization of A&E services was found by the previous review (4) to be lower, equal or higher; in contrast, our review shows a generally higher use of those services by migrants. For hospitalizations and screening, the results of the two reviews are similar, both indicating a higher use of hospitalizations among migrants and a lower use of screening services. The comparability on a European basis is hindered in both reviews by the lack of common definitions of migrants. In contrast to the previous review, however, our work found a strong emphasis in the reviewed studies on political recommendations to implement policies and practices to reduce barriers and gaps between migrants and non-migrants.

### ***Limitations of the included studies***

As mentioned with regard to the quality of the included studies (see results section), the available evidence we could identify has important limitations. One of the fundamental challenges is that migrants are not defined in the same manner in all of the included studies, diminishing their comparability. Norredam et al. (2009) already suggested the introduction of a common glossary for future European comparisons (4). Migrants' geographical origin is presented in many cases very broadly, i.e. mentioning whole continents as origin or even just regions such as low or high income countries, implying a threat of generalizations from the migrant sample. As some studies are using geographical regions rather than countries of origin, important information on variation in origin will be lost. As no clear tendencies could be detected in terms of origin of the migrants, the study's results remain quite broad. Included studies also differed vastly in terms of sample size. While most studies used samples of more than 1000 individuals, almost 20% of studies relied on smaller samples, resulting in a lack of statistical power, as the probability of finding a statistically significant difference between migrants and non-migrants increases with a larger sample. In order to draw conclusions about migration processes and history, it would also be helpful to have information on the type of migration, such as labour migration, family reunification, study, or forced versus voluntary migration. Yet, the motivation behind the migration process was not

clearly described in 82% of articles reviewed. Three-quarters of the studies use a cross-sectional design from which they draw their data, which triggers the question of how representative the results of such a snapshot are.

### ***Limitations of our search strategy***

Arguably, this study ignores potentially important research that was published in languages other than English. Publications before 2009 were not included, since the previous systematic review covered the period 1999-2009 (4). The present review only focussed on the utilization of somatic health services, excluding studies on mental health services. Literature not published in scientific journals (e.g. published by government agencies or private foundations) was also not included in the review, as we confined our search to articles indexed in Embase, Medline or Cinhal. Future studies should aim to fill these gaps, with systematic reviews on mental health care utilization by migrants as compared to non-migrants, as well as reviews of health care utilization by children.

## **Conclusion**

This article presents the findings of a systematic review of recent empirical evidence on the differences in utilization of health care services between migrants and non-migrants. Keeping in mind the substantial differences between countries and the limited evidence base from which to draw conclusions, the review suggests that migrants and non-migrants in Europe do not systematically differ in their utilization of GP services. Yet, for most of those countries for which evidence is available, migrants were more likely to use A&E services, and are more often hospitalized than natives. By contrast, non-migrants use screening services and specialized care more frequently than migrants, suggesting inequitable access of migrants to preventive health services.

However, a Europe-wide comparison is, due to a lack of data and the limited comparability of studies, not possible. Nevertheless, contrary to previous systematic reviews (4), the results paint a clearer picture with regard to the types of health services in which utilization differs between the two groups and where barriers might exist in specific countries. However, from a public health perspective, a deeper understanding of these barriers is crucial to minimize differences and provide equal access to health care services for all inhabitants.

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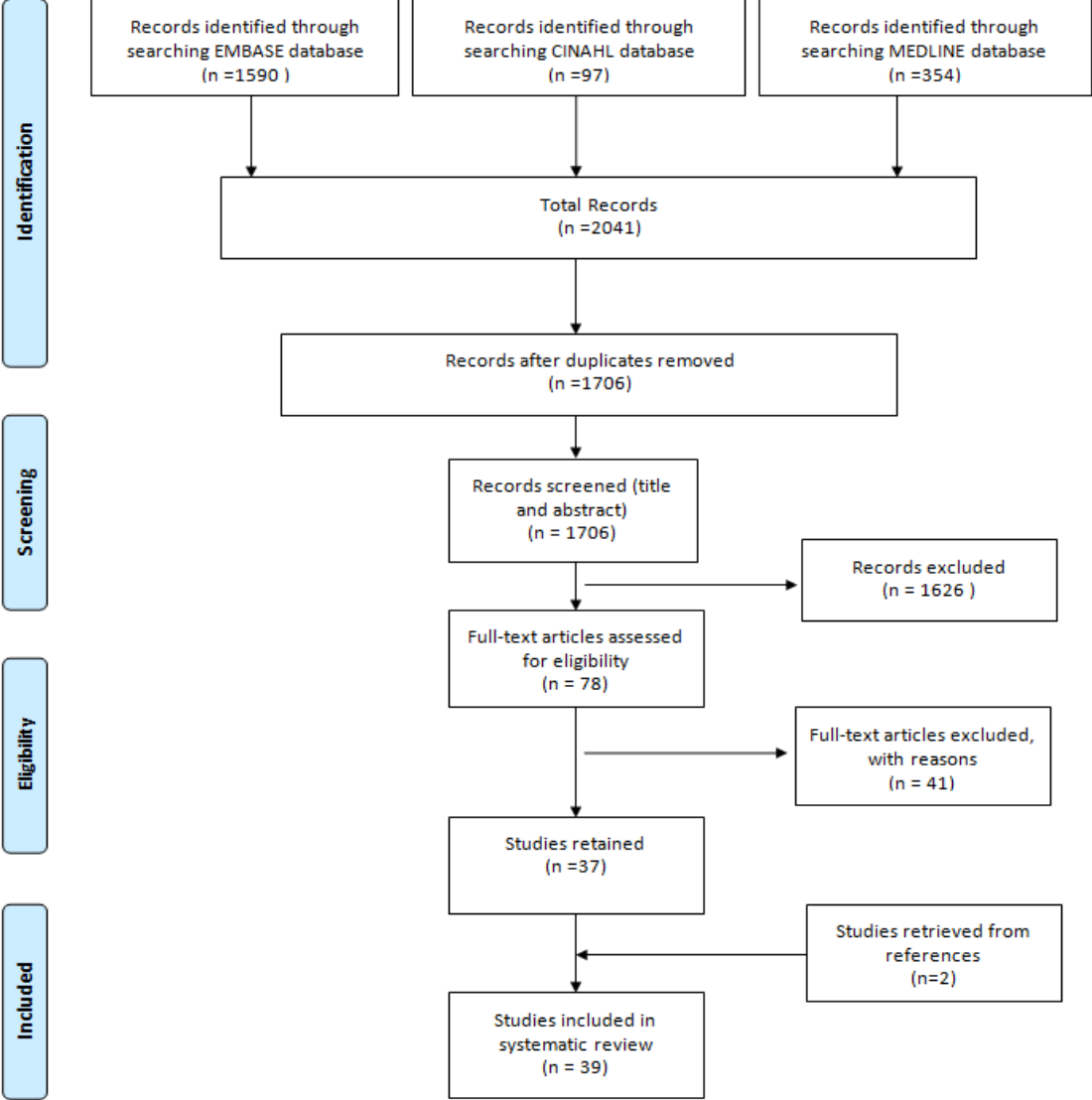
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**Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart**



**Table 1. Description of included studies**

	N= 39 <sup>C</sup> n (%)
<b>General characteristics of the study:</b>	
<b>Receiving countries</b>	
Spain	14 (36%)
Denmark	4 (10%)
Italy	3 (8%)
Czech Republic	1 (3%)
Norway	7 (18%)
Sweden	2 (5%)
Germany	2 (5%)
Greece	1 (3%)
The Netherlands	4 (10%)
Multi-country analysis <sup>A</sup>	1 (3%)
<b>Type of health services</b>	
GP services	16 (44%)
Hospitalization	10 (26%)
Outpatient specialist services	10 (26%)
A &E services	13 (33%)
Screening	14 (36%)
<b>Characteristics of migrants in the study:</b>	
<b>Number of migrants included</b>	
up to 1000	7 (18%)
more than 1000	30 (77%)
Not defined	2 (5%)
<b>Information on place of birth</b>	
Specific country of birth	13 (33%)
Specific region of birth	16 (41%)
Non-specific	8 (21%)
Includes both region and country	2 (5%)
<b>Information on type of migration</b>	
Yes	7 (18%)
No	32 (82%)
<b>Methodological characteristics:</b>	
<b>Data source</b>	
Registry	21 (54%)
Survey	17 (44%)
Registry and survey	1 (3%)
<b>Representativeness of study population</b>	
National representativeness	22 (56%)
Regional or local representativeness	16 (41%)
Not defined	1 (3%)
<b>Study design</b>	
Cross-sectional	29 (74%)
Cohort	4 (10%)
Retrospective observational	1 (3%)
Feasibility study	1 (3%)
<b>Adjustment</b>	
Defined <sup>B</sup>	33 (85%)
Migrant status one indicator among many	6 (15%)

Note:

A: This study includes data on Austria, Belgium, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden and Switzerland

B: If a study specifies adjustments such as e.g. age, gender or socio-economic status, the study was classified as 'defined'

C: The total number of studies per category can be different from 39 because some articles fall into several categories

**Table 2. Summary of major findings**

GENERAL PRACTITIONER		HOSPITALIZATION		OUTPATIENT SPECIALIST		ACCIDENT & EMERGENCY		SCREENING	
Article	Utilization by migrants compared to non-migrants + =higher; - =lower; x =not different	Article	Utilization by migrants compared to non-migrants + =higher; - =lower; x =not different	Article	Utilization by migrants compared to non-migrants + =higher; - =lower; x =not different	Article	Utilization by migrants compared to non-migrants + =higher; - =lower; x =not different	Article	Utilization by migrants compared to non-migrants + =higher; - =lower; x =not different
<i>Nielsen et al. (7)</i>	+	<i>Nielsen et al. (7)</i>	+	<i>Nielsen et al. (7)</i>	+	<i>Buja et al. (2)</i>	+	<i>Berens et al. (30)</i>	+
<i>Garcia-Subirats et al. (8)</i>	+	<i>Garcia-Subirats et al. (8)</i>	x	<i>Garcia-Subirats et al. (8)</i>	x	<i>Nielsen et al. (7)</i>	+	<i>Ricardo-Rodrigues et al. (31)</i>	-
<i>Solé-Auró, Guillén and Crimmins (9)</i>	+	<i>Glaesmer et al. (11)</i>	+	<i>Muñoz et al. (10)</i>	+	<i>Garcia-Subirats et al. (8)</i>	x	<i>López et al (32)</i>	-
<i>Muñoz et al. (10)</i>	+	<i>Denktaş et al. (13)</i>	x	<i>Glaesmer et al. (11)</i>	-	<i>Diaz et al. (14)</i>	+	<i>Jensen et al. (33)</i>	-
<i>Glaesmer et al. (11)</i>	+	<i>Hernandez-Quevedo and Jiménez-Rubio (15)</i>	+	<i>Hernandez-Quevedo and Jiménez-Rubio (15)</i>	-	<i>Hernandez-Quevedo and Jiménez-Rubio (15)</i>	+	<i>Rodríguez-Salés et al. (34)<sup>D</sup></i>	+/-
<i>Diaz et al. (12)</i>	+	<i>Malmusi et al. (16)<sup>B</sup></i>	+/-	<i>Malmusi et al.(16)</i>	-	<i>Malmusi et al. (16)</i>	-	<i>Carrasco-Garrido et al. (37)</i>	-
<i>Denktaş et al. (13)</i>	+	<i>Sanz et al. (22)</i>	x	<i>Jiménez-Rubio and Hernández-Quevedo (17)</i>	-	<i>Jiménez-Rubio and Hernández-Quevedo (17)</i>	+	<i>Linne et al (42).</i>	-
<i>Diaz et al. (14)<sup>A</sup></i>	+/-	<i>Rinaldi et al.(24)</i>	+	<i>Sanz et al. (22)<sup>C</sup></i>	-/x	<i>Sanz et al. (22)<sup>C</sup></i>	-/x	<i>Azerkan et al.(43)</i>	-
<i>Hernandez-Quevedo and Jiménez-Rubio (15)</i>	-	<i>de Bruijne et al.(25)</i>	+	<i>De Luca, Ponzo and Rodríguez Andrés (23)</i>	-	<i>De Luca et al. (23)</i>	+	<i>Kristiansen et al. (44)</i>	-
<i>Malmusi et al. (16)</i>	-	<i>Ramos et al. (26)</i>	-	<i>Neergaard et al. (27)</i>	+	<i>Ruud et al. (28)</i>	+	<i>Sanz-BarberoI, RegidorI and Galindol (45)</i>	-
<i>Jiménez-Rubio and Hernández-Quevedo (17)</i>	-					<i>Carrasco-Garrido et al. (29)</i>	+	<i>Simou et al. (46)</i>	-
<i>Diaz and Kumar (18)</i>	-					<i>Sandvik, Hunskaar, Diaz (41)</i>	-	<i>Sanjosé et al. (47)</i>	-
<i>de Back et al. (19)</i>	-							<i>Pons-Vigues et al.(48)</i>	-
<i>Gimeno-Feliu et al. (20)</i>	-							<i>Frederiksen et al.(49)</i>	-
<i>Sanz et al. (22)</i>	x								
<i>De Luca , Ponzo and Rodríguez Andrés (23)</i>	x								
<b>TOTAL</b>	<b>8(+), 7(-), 2(x)</b>	<b>TOTAL</b>	<b>6(+), 2(-), 3(x)</b>	<b>TOTAL</b>	<b>3(+), 2(-), 2(x)</b>	<b>TOTAL</b>	<b>9(+), 3(-), 2(x)</b>	<b>TOTAL</b>	<b>2(+), 13(-), 0(x)</b>

Note: A: Results differ between migrants from high income countries and low income countries; B: Results differ between long term visa and permanent visa holder; C: Results differ between male and female; D: Results differ between first and second round screening