

# Access to healthcare for undocumented migrants: analysis of avoidable hospital admissions in Sicily from 2003 to 2013

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**Background:** Access to healthcare services for undocumented migrants is one of the main public health issues currently being debated among European countries. Exclusion from primary healthcare services may lead to serious consequences for migrants' health. We analyzed the risk among undocumented migrants, in comparison with regular migrants, of being hospitalized for preventable conditions in the Region of Sicily (Italy). **Methods:** We performed a hospital-based cross-sectional study of the foreign population hospitalized in the Sicily region between 1 January 2003 and 31 December 2013. The first outcome was the proportion of avoidable hospitalization (AHs) among regular and irregular migrants. Second outcomes were the subcategories of AHs for chronic, acute and vaccine preventable diseases. **Results:** 85 309 hospital admissions were analyzed. In the hospitalized population, in comparison to regular migrants, undocumented migrants show a higher proportion of hospitalization for diseases preventable through primary and preventive care (AOR 1.48, 95%CI 1.37–1.59). The proportion of avoidable hospitalizations associated with the lack of legal status is higher for vaccine preventable conditions (AOR 2.06, 95%CI 1.66–2.56) than for chronic conditions (AOR 1.47, 95%CI 1.42–1.63) and acute conditions (AOR 1.37; 95%CI 1.23–1.53). Between 2003 and 2013, the proportion of avoidable hospitalizations decreased both in regular and undocumented migrants but decreased faster for regular than for undocumented migrants. **Conclusions:** Undocumented migrants experience higher proportion of hospitalization for preventable conditions in comparison with regular migrants probably due to a lack of access to the national healthcare service. Policies and strategies to involve them in primary healthcare and preventive services should be developed to tackle this inequality.

## Introduction

Europe is facing the largest migration influx of recent years. The asylum requests in EU countries doubled from 2014 to 2015, passing from fewer than 600 thousand to over 1.2 million in 1 year.<sup>1</sup>

Between January and November 2016, 173 thousand migrants arrived in Italy through the Mediterranean sea. The majority originated from central Africa (namely Nigeria, Eritrea and Guinea). The proportion of Iraqis, Syrians and Afghans amongst arrivals to Italy remain very low (less than 1% each). Around 70% of the newly arrived migrants are men and the majority of them apply for asylum once arrived in Italy.<sup>2</sup>

European countries fear the economic impact of migration and some of them state that they do not have the resources to host migrants and refugees or to provide them with the social welfare they offer to their citizens. Accessibility to public healthcare service is a crucial area of debate and despite the huge body of international legislation claiming for undocumented migrants to have the right to access health services, many European countries allow only partial or no access to such services.<sup>3</sup>

Italy is one the European countries enabling migrants to have wider access to its healthcare services.<sup>3</sup> Italian legislation, in fact, ensures urgent, essential and continuous care to undocumented migrants.

Nevertheless, the approach concerning primary healthcare access is not well defined and strategies to involve undocumented migrants are rarely implemented.<sup>4</sup> Sicily has been the door of Europe for at least the last 10 years and it has worked to create integrated care for Undocumented Migrants (UM), while also adopting an emergency plan to manage the overflow of migrants.<sup>5,6</sup> Nonetheless, the lack of clarity of the national legislation, coupled with the known extra-legal barriers posed by language, culture and fear of legal consequences could affect migrants' health in Sicily too.<sup>7,8</sup>

According to much scientific evidence, lack of access to primary healthcare services can lead to Avoidable Hospitalizations (AHs), exposing patients to the risks of the hospital environment (e.g. infection, depression, injuries) and lead to national health systems incurring avoidable costs.<sup>9–12</sup> AHs are defined as conditions which could have been treated in a primary care setting or prevented through preventive strategies but at the moment of the presentation or of the complication require hospitalization (e.g. COPD exacerbation).<sup>13</sup> The strength of the relationship has led to the AHs rate being widely used as a marker of primary care effectiveness.<sup>10,14–17</sup>

To improve undocumented migrants' access to Italian primary healthcare and preventive services, we investigated the proportion of AHs among migrants hospitalized in Sicily between 2003 and 2013. Thus, in order to identify groups at higher risk of exclusion from

primary and preventive care, we assessed whether being undocumented, or other risk factors, exposes migrants to a higher proportion of AHs and health risks. Moreover, we analyzed the trend of the proportion of AHs both for regular and undocumented migrants.

## Methods

### *Study design and data collection*

We performed a cross-sectional study in the Sicilian region. The source of data was the hospital discharge informational flux coming from all the hospitals located in Sicily. The population served by the hospitals consists of approximately 5 million residents in the Sicily Region plus the population who are not registered (UM).<sup>18</sup> Hospital discharge records from 2003 to 2013 were examined.

Information about hospital discharges was obtained in July 2014. The following information was collected for each hospitalization: demographic characteristics including gender, age and geographical area of origin, diagnosis at discharge, unit of admission, destination at discharge and length of stay. The diagnoses at discharge were performed according to the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM).

### *Participants*

Only patients who were citizens of countries with a strong migratory pressure and who were older than 15 years of age were included in the analysis. Among this population we defined as Migrants in Regular Condition (MRC) those patients accessing the National Healthcare Service (NHS) through the official NHS registration code, undocumented migrants are not entitled of an official NHS registration code thus they access the NHS through an anonymous code called 'temporarily present foreigner' (STP code). We identified UM as the patients older than 18 years, coming from countries with a strong migratory pressure and accessing the NHS through the STP code.

### *Outcomes and covariates*

The outcomes evaluated were the overall proportion of AHs and three subcategories: AHs determined by deteriorations in chronic conditions, AHs caused by acute conditions and AHs caused by vaccine preventable conditions. The proportions were calculated on the total hospitalizations and not on the total population of migrants living or staying temporarily in Sicily. The lack of data concerning the number of UM staying in Sicily prevented the calculation of the rate as a proportion of the migrant population.

Conditions classified as AHs were selected on the basis of the literature<sup>13,19</sup> and organized in the three subcategories according to the National Health Performance Authority of Australia, which in 2012 published a report classifying AHs on the basis of pathological conditions leading to hospitalizations.<sup>17</sup> The complete list of pathological conditions classified as AHs is provided in Supplementary data S1.

As covariates of the binary logistic regression models for all the outcomes considered, we adopted gender, age group (15–25, 25–34, 35–49 and 50+), legal status referring to the condition of regular or undocumented migrants (MRC, UM), and geographical area of origin (East Europe, Central-South Africa, West Africa, East Africa, North Africa, Latin America, Central-South Asia, West Asia, East Asia).

### *Statistical analysis and result reporting*

Demographic characteristics of the sample were analyzed in order to assess differences between the MRC and UM populations, Pearson's chi square test was performed and significance level was set at 0.05. Stratified analyses were performed to assess the risk of AHs related to the lack of legal status condition, among the hospitalized population, for each gender, age group and geographical area of origin. Odds

Ratios (OR) and 95% Confidence Intervals (95% CI) were calculated. Univariate analysis was performed to assess the role of demographic factors and legal status (undocumented vs. regular) on each outcome. OR and 95% CI were calculated for each variable examined in relation with the four outcomes. Four multivariable analyses (binary logistic) were conducted to assess the adjusted risk of AHs (and subtypes), caused by legal status, gender, age group and geographical area of origin. Adjusted Odds Ratios (AOR) with 95% CI were calculated. A Trend Analysis was conducted in order to evaluate the AH trend for MRC and UM within the studied period. Analyses were conducted utilizing software SPSS 22.0 and Joinpoint Regression.<sup>20</sup> Results are reported according to the Strobe Statement.

## Results

Within the period studied 85 309 hospital admissions were analyzed, 72 212 were MRC and 13 097 were UM. In the UM group females represented 46.7% and males 53.3%, while among MRC 62.2% were females and 37.8% were males. Among UM 66% of the sample were younger than 35 years While of the MRC sample, 51% were older than 34 years.

In the group of UM, the most represented geographical origin was West Africa (28%) followed by North Africa (22%), East Europe (15%), East Africa (14%) and Center South Asia (12%). In the MRC group, the most common geographical origin was North Africa (33%) followed by Center South Asia (15%), East Europe (14%), West Africa (10%) and Latin America (10%).

To summarize, the UM population was generally younger than the MRC population and was predominantly male. Patients from West Africa and East Africa represented more than 40% of UM hospitalized while 33% of MRC come from North Africa. Demographic characteristics of the sample are shown in Supplementary data S2.

In order to minimize the impact of differences in gender, age and geographical origin distribution between the two groups, we performed stratified analyses and multivariable analyses evaluating the proportions of AH among MRC and UM. [Figure 1](#) shows the results of the stratified analysis evaluating AH and the ORs with 95% CI for UM compared with MRC for the outcome AHs (table available on line).

The lack of legal status (UM) was associated with an increased proportion of AHs in both genders: for UM males the Odds Ratio (OR) was 1.33 (95% CI 1.22–1.45) and for UM females the OR was 1.39 (95% CI 1.24–1.55). In comparison with MRC, UM showed higher proportion of AHs in each age range, with the peak difference between the two groups being in the age band 25 and 34 (OR 1.98; 95% CI 1.75–2.23).

UM coming from Center South Asia (OR 1.7; 95%CI 1.44–2.00), West Africa (OR 1.56; 95% CI 1.35–1.80), North Africa (OR 1.31; 95% CI 1.13–1.52), East Africa (OR 1.28; 95% CI 1.06–1.55) and East Europe (OR 1.27 95% CI 1.05–1.55) showed higher proportion of AHs in comparison with MRC from the same areas.

In order to assess the impact of legal status and demographic factors on the proportion of AH, univariate and multivariable analyses were performed, ORs and AORs were calculated. Results are shown in [figure 2](#) (table available on line).

In the overall hospitalized migrant population (UM and MRC), undocumented condition was associated with an increased risk of AHs (Adjusted Odds Ratio 1.48; 95%CI 1.37–1.59). Moreover, gender, age and geographical origin affected the frequency of AHs. Female gender was associated with lower proportions of AH (Adjusted Odds Ratio 0.69; 95%CI 0.63–0.75). Older age (Adjusted Odds Ratio 2.22; 95%CI 2.02–2.44) and coming from center-southern Asia (Adjusted Odds Ratio 1.55; 95%CI 1.40–1.71), Western Asia (Adjusted Odds Ratio 1.53; 95%CI 1.21–1.94) West Africa and East Africa (Adjusted Odds Ratio 1.43; 95%CI 1.29–1.60 and 1.35; 95%CI 1.20–1.52) were positively associated with a higher proportion of AHs. For a better definition of the

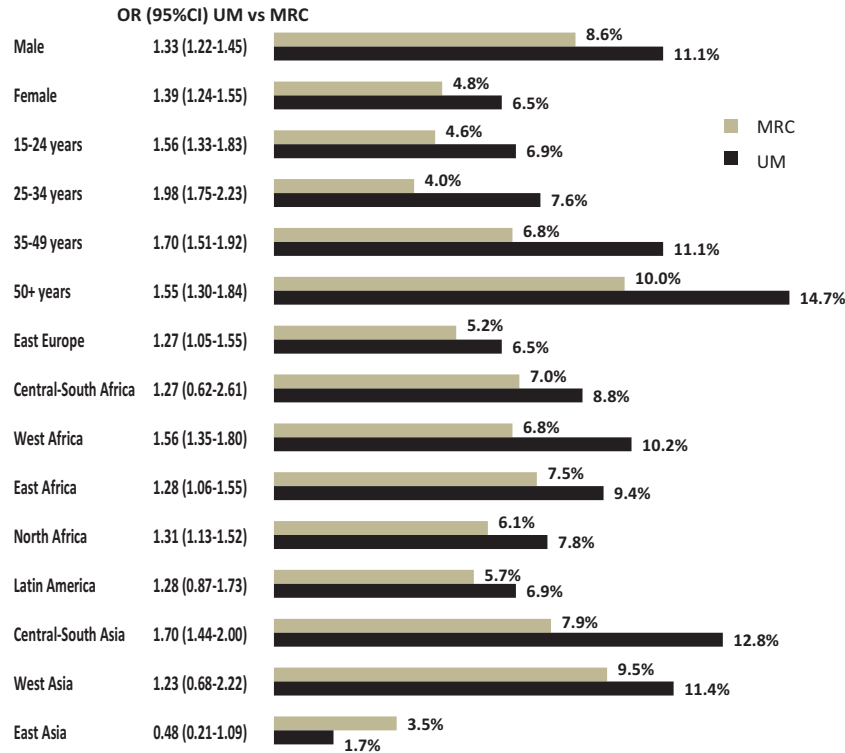


Figure 1 Proportions of AHs stratified for gender, age and geographical origin, comparison between MRC and UM

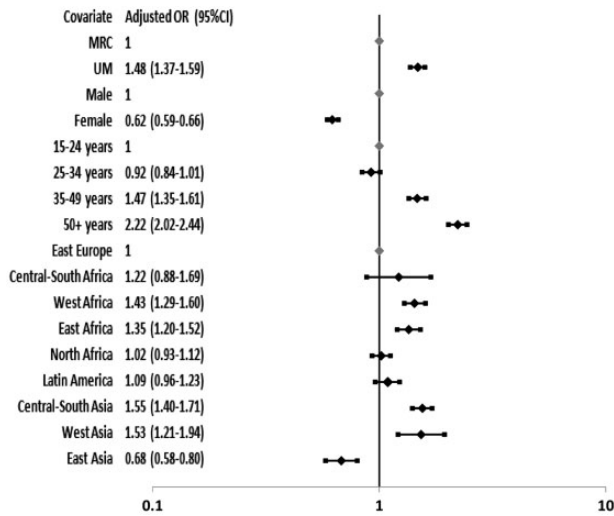


Figure 2 Factors associated with proportion of AHs, results of logistic multivariable analysis evaluating the impact of legal status, gender, age and geographical origin on the proportions of AHs

conditions leading to AHs and the categories at risk, we performed three multivariable analyses. The outcomes for the analyses were AHs caused by three different typologies of pathological conditions (chronic, acute and vaccine preventable conditions). The covariates were the same in all three cases: legal status and the demographic factors available in the hospital discharge schedule (gender, age and geographical origin). Table 1 summarizes the results of the multivariable analyses.

Among hospitalized migrants undocumented condition was associated with higher risk for all the typologies of AHs evaluated, being in an undocumented condition exposed migrants to an increased risk of vaccine preventable conditions (Adjusted Odds Ratio 2.06; 95%CI 1.66–2.56), chronic conditions (Adjusted Odds

Ratio 1.47; 95%CI 1.42–1.63) and acute conditions (Adjusted Odds Ratio 1.37; 95%CI 1.37–1.53).

Hospitalized females were less at risk than males for all the types of AHs evaluated, although the disparity between genders was highest for vaccine preventable conditions (Adjusted Odds Ratio 0.26; 95% CI 0.21–0.32). This finding may be explained by considering that the first causes of hospital admission for women are pregnancy and delivery which are not considered preventable. The proportion of AHs due to chronic conditions increases with age. In the group 50+ they represented 8.7% of all hospitalizations (Adjusted Odds Ratio 7.2; 95%CI: 6.12–8.47) while AHs due to acute and vaccine preventable conditions decrease with age.

Concerning geographical origins, patients showing the highest proportion of AHs due to chronic conditions were from West Africa (Adjusted Odds Ratio 1.59 95%CI 1.36–1.84) Central South Asia (Adjusted Odds Ratio 1.81; 95%CI 1.57–2.08) and West Asia (Adjusted Odds Ratio 1.71; 95%CI 1.25–2.33). For AHs due to acute conditions, patients coming from Central South Africa, Western and Eastern Africa and Latin America were more at risk. Patients coming from East Africa showed higher proportions of vaccine preventable AHs (Adjusted Odds Ratio 3.55; 95%CI 2.33–5.40), followed by patients from Center South Asia (Adjusted Odds Ratio 2.9; 95% CI 1.93–4.35) and West Africa (Adjusted Odds Ratio 1.7; 95%CI 1.10–2.64).

### Trend analysis

The proportions of AH in the decade 2003–13 decreased both in MRC and UM but the Annual Percentage Change (APC) is higher for MRC (APC –4,9%;  $P < 0,05$ ) than for UM (APC –4,2%;  $P < 0,05$ ) figure 3.

## Discussion

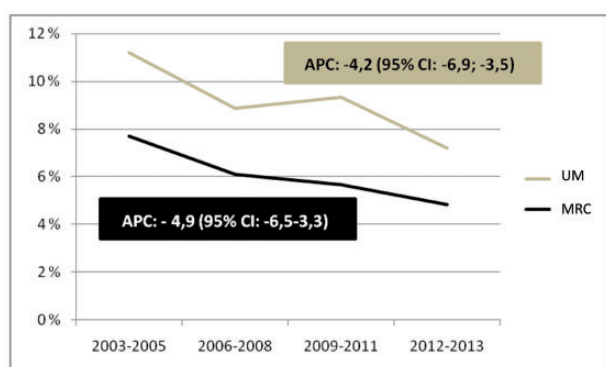
### Key findings

This study highlights that undocumented migrants have a higher risk of being hospitalized for preventable diseases than do regular

**Table 1** Factors associated with proportions AHs due to chronic conditions, acute conditions and vaccine preventable conditions

Legal status	Not AHs (%)	Chronic AHs (%)	AOR (95% CI)	Acute AHs (%)	AOR (95% CI)	Vaccine prev AHs (%)	AOR (95% CI)
MRC	67740 (93.8)	2387 (3.4)	1	1788 (2.5)	1	297(0.4)	1
UM	11927 (91.1)	511 (4.1)	<b>1.47 (1.42–1.63)</b>	514 (4.1)	<b>1.37 (1.23–1.53)</b>	145(1.1)	<b>2.06 (1.66–2.56)</b>
Gender	Not AHs (%)	Chronic AHs (%)	AOR (95% CI)	Acute AHs (%)	AOR (95% CI)	Vaccine prev AHs (%)	AOR (95% CI)
M	31166 (90.9)	1672 (5.1)	1	1115 (3.4)	1	325 (1.0)	1
F	48501 (95.0)	1226 (2.5)	<b>0.65 (0.60–0.70)</b>	1187 (2.4)	<b>0.69 (0.63–0.75)</b>	117(0.2)	<b>0.26 (0.21–0.32)</b>
Age	Not AHs (%)	Chronic AHs (%)	AOR (95% CI)	Acute AHs (%)	AOR (95% CI)	Vaccine prev AHs (%)	AOR (95% CI)
15–25	13882 (94.9)	178 (1.2)	1	462 (3.3)	1	105 (0.7)	1
25–34	27618 (95.4)	437 (1.5)	<b>1.23 (1.03–1.47)</b>	780 (2.8)	<b>0.87 (0.77–0.98)</b>	126 (0.4)	<b>0.64 (0.49–0.83)</b>
35–49	24059 (92.6)	1029 (4.1)	<b>3.27 (2.78–3.85)</b>	768 (3.0)	<b>0.96 (0.85–1.08)</b>	124 (0.5)	<b>0.64 (0.49–0.84)</b>
50+	14108 (89.6)	1254 (8.7)	<b>7.2 (6.12–8.47)</b>	292 (1.9)	<b>0.63 (0.54–0.74)</b>	87 (0.6)	0.82 (0.61–1.11)
Geographical origin	Not AHs (%)	Chronic AHs (%)	AOR (95% CI)	Acute AHs (%)	AOR (95% CI)	Vaccine prev AHs (%)	AOR (95% CI)
East Europe	11670 (94.6)	340 (2.8)	1	299 (2.5)	1	31 (0.3)	1
Central-South Africa	523 (92.6)	14 (2.5)	0.79 (0.46–1.36)	24 (4.4)	<b>1.61 (1.05–2.46)</b>	4(0.7)	2.19 (0.76–6.25)
West Africa	9706 (92.0)	410 (4.0)	<b>1.59 (1.36–1.84)</b>	371 (3.6)	<b>1.29 (1.10–1.51)</b>	61(0.6)	<b>1.7 (1.10–2.64)</b>
East Africa	6126 (92.0)	225 (3.5)	1.16 (0.97–1.38)	226 (3.5)	<b>1.3 (1.09–1.55)</b>	79 (1.2)	<b>3.55 (2.33–5.40)</b>
North Africa	25303 (94.3)	928 (3.6)	1.07 (0.94–1.21)	646 (2.5)	0.94 (0.81–1.08)	112 (0.4)	1.28 (0.86–1.92)
Latin America	7032 (93.0)	176 (2.4)	<b>0.82 (0.68–0.99)</b>	233 (3.2)	<b>1.38 (1.16–1.64)</b>	20(0.3)	1.31 (0.74–2.30)
Central-South Asia	11601 (91.5)	618 (5.1)	<b>1.81 (1.57–2.08)</b>	359 (2.9)	1.13 (0.97–1.33)	106 (0.8)	<b>2.9 (1.93–4.35)</b>
West Asia	797 (90.3)	50 (6.0)	<b>1.71 (1.25–2.33)</b>	32 (3.8)	1.39 (0.95–2.02)	4 (0.5)	1.17 (0.41–3.33)
East Asia	6116 (96.6)	98 (1.6)	<b>0.64 (0.51–0.81)</b>	94 (1.5)	<b>0.63 (0.50–0.80)</b>	22 (0.3)	1.74 (1.00–3.01)

Results of logistic multivariable analyses evaluating the impact of legal status, gender, age and geographical origin on the proportion of AHs.



APC: Annual Percent Change  
CI: Confidence Interval

**Figure 3** Trend of AHs among MRC and UM between 2003 and 2013 with Annual Percent Change and 95%CI. APC: Annual Percent Change; CI: Confidence Interval

migrants, independently of gender, age group or geographical origin. Undocumented migrants are more at risk than regular migrants for each group of diseases considered: chronic, acute and vaccine preventable conditions.

The study pinpoints the categories at higher risk of exclusion from primary care: older age groups are more at risk for AHs overall and for the subcategory of AHs due to chronic conditions, but are less at risk for AHs due to acute conditions. For vaccine preventable AHs, people aged 15–24 and older than 49 are at highest risk. Compared with other geographical origins patients coming from center-South and West Asia, and from West and East Africa have the highest risk AHs. This information may be useful for tailoring specific primary and preventive services to the needs of these groups.

Over the 11 years studied, the proportions of AH decreased for both UM and MRC, but the proportion improved at a greater rate in the MRC population.

### Limitations

The study presents some limitations. One limitation lies in the lack of background demographic data for the UM. Because of the lack of

data on the undocumented migrants living in Sicily we had not the opportunity to calculate AHs rates but only AHs proportion on the hospitalized population. Given that the proportions for both UM and MRC were calculated using the same method, they can still be legitimately compared, and the results remain useful and relevant in their capacity to demonstrate this comparison. Nonetheless, estimates of the number of UM living in Sicily would be useful for researchers and public health workers, allowing them to calculate hospitalization rates for different causes in relation to the demographic characteristics of the UM population. This information could help to challenge misbeliefs concerning the epidemiological profile of incoming migrants and the health risks for the population as a whole.

The second limitation lies in the specific health system within which the study was conducted, which, since the results reflect the Italian and Sicilian policy on primary care provisions for migrants, may limit the extent to which it can be considered representative. Other healthcare systems with different national and local organizations might obtain different performances.

The third limitation lies in the assumption that the epidemiological profiles, and thus the risks of hospitalization, of the two populations (regular and undocumented) should be similar once the analyses are adjusted for demographic factors. However, a higher proportion of AHs among hospitalized undocumented migrants may be also due to a lower risk of other hospitalizations in this population compared to regular migrants.

### Interpretation

Large influxes of migrants to Europe have become common, leading policy makers dealing with all aspects of migration management. Migration can no longer be treated as an emergency phenomenon only but should be faced with structural approaches. Information concerning migrants' health and migrants' access to healthcare services has become crucial in order to orient decision making.

Avoidable Hospitalizations can be attributed to factors including lack of legal rights to healthcare access<sup>21</sup> as well as to extra-legal barriers such as language, fear of legal consequences and low levels of knowledge about available healthcare services.<sup>7,22,23</sup> We can presume that barriers stemming from the process of migration itself should be common between the two populations studied

(MRC and UM); thus, the difference in the proportions of AHs can be mainly attributed to difference in legal status. Our findings, in fact, are consistent with the limited evidence on the issue currently available at the international level. Studies performed in the US, UK and Switzerland confirm the difficulties of UM in accessing healthcare services.<sup>24–26</sup>

WHO identified primary healthcare as a priority for improving overall population health.<sup>27</sup> The findings of this study clearly show that, in a system where two groups have different rights, or at least different opportunities, to access primary care, the group with restricted access will experience more hospital admissions which may have been prevented. The findings are in line with current available literature on the topic, suggesting that undocumented migrants' exclusion from healthcare services, even if it is only from primary healthcare, is not only dangerous for their health but might also be economically disadvantageous for the NHS of EU hosting countries.<sup>28,29</sup> Widening and actively promoting access to primary care for a vulnerable group such as UM could be an effective way to reduce the unnecessary health risks and financial costs of avoidable hospitalizations.

## Supplementary data

Supplementary data are available at *EURPUB* online.

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## Contributors

Daniele Mipatrini and Santino Severoni formulated the hypothesis and the concept of the study. DM performed the analyses and produced the first draft. All authors contributed substantially to the design and realization of the study. SPA extracted data from the regional information system. The interpretation of the results and the review of the paper is due to the contribution of all authors.

*Conflicts of interest:* None declared.

## Key points

- Undocumented migrants show a higher proportion of avoidable hospitalizations than do regular migrants, independently of gender, age group or geographical origin.
- Hospitalized undocumented migrants are more at risk for avoidable hospitalizations for each subgroup of diseases considered: chronic, acute and vaccine preventable conditions.
- Over the 11 years studied, the proportions of avoidable hospitalizations are improving at a greater rate in regular migrants.
- Restricting access to national healthcare services has serious consequences for undocumented migrants' health. At national level health policies should ensure the highest levels of accessibility to hospital, primary and preventive healthcare to undocumented migrants.
- Interventions should be designed and implemented at a local level to cope with the specific needs of those migrant groups that are hardest for the National Healthcare Service to reach.

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