

From the “real-world evidence” to prevention strategies: health inequalities in immigrants residing in an Italian Local Health Unit

Dalla “real-world evidence” alle strategie preventive: disuguaglianze di salute negli immigrati di un’Azienda sanitaria locale italiana

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ABSTRACT

OBJECTIVES: to assess the health inequalities of immigrants in the Local Health Unit (LHU) n.1 of the Abruzzo Region with a real-world approach. In particular, 4 main categories of hospitalisation (MDC) linked to health risk behaviours and social determinants were analysed.

DESIGN: retrospective study on hospital discharge data (HDD).

SETTING AND PARTICIPANTS: resident population in the LHU n.1 of the Abruzzo Region between 2010 and 2018. Hospital discharge forms (HDFs) of the hospitals under the administration of the LHU No. 1 of the Abruzzo Region, which includes three geographical areas (Marsica, Peligno-Sangrigna, L’Aquila), in the years 2010-2018 were analysed.

MAIN OUTCOME MEASURES: crude hospitalisation trends for immigrants and Italians; comparison of standardised hospitalisation rates in the main immigrant communities.

RESULTS: overall, 26,570 SDO were analysed. Average age of inpatients was 40 years (± 16) and average hospital stay was 4 days (± 7). Immigrants showed a lower tendency to hospitalisation than Italians with a decreasing trend from 2010 to 2018, contrary to the Italians. The Romanian population has a hospitalisation risk for alcohol abuse/drugs and induced organic mental disorders about twice as much as the Italian population. Women from Morocco experienced caesarean section with complications about four times more than the Italian women.

CONCLUSIONS: the analysis of routine data highlighted excesses of hospitalisation by some causes and birthplaces. A real-world approach can be useful and timely to the implementation of preventive strategies for specific diseases in defined local areas.

Keywords: immigrants, hospitalisation, inequalities, real-world evidence

RIASSUNTO

OBIETTIVI: valutare le disuguaglianze di salute degli immigrati nella Azienda sanitaria locale n.1 della Regione Abruzzo con un approccio real-world. In particolare, sono state analizzate 4 categorie principali di ricovero (MDC) legate a comportamenti rischiosi per la salute e a determinanti sociali.

DISEGNO: studio retrospettivo sui dati delle schede di dimissione ospedaliera (SDO).

WHAT IS ALREADY KNOWN

■ The “National Health Interview Surveys” implemented by the Italian National Institute of Statistics offered a wide range of information about health conditions and accessibility to health services of immigrants in Italy.

■ The Italian Network for Longitudinal Metropolitan Studies (IN-LiMeS) showed that adult immigrants are at higher risk of undergoing hospital admissions that could be avoided through appropriate outpatient care.

WHAT THIS PAPER ADDS

■ Hospital discharge data can be an important instrument to examine the real world of migrant health in a Local Health Unit and to identify the health needs for different immigrant communities in local areas.

■ Analysing hospital discharge data can provide useful information to improve health services and implement preventive strategies in target populations.

SETTING E PARTECIPANTI: popolazione residente nella ASL n.1 della Regione Abruzzo tra il 2010 e il 2018. Sono state analizzate le SDO dei presidi ospedalieri della ASL n.1 della Regione Abruzzo, che insistono su tre aree geografiche (Marsica, Peligno-Sangrigna, L’Aquila), negli anni 2010-2018.

PRINCIPALI MISURE DI OUTCOME: andamento dei tassi grezzi di ospedalizzazione degli immigrati e degli italiani; confronto dei tassi di ospedalizzazione standardizzati dei principali gruppi etnici rilevati per specifiche MDC.

RISULTATI: sono state analizzate nel complesso 26.570 SDO. L’età media dei ricoverati è risultata pari a 40 anni (± 16) e la degenza media è stata di 4 giorni (± 7). Gli immigrati mostrano una minore tendenza al ricovero rispetto agli italiani con un progressivo trend decrescente dal 2010 al 2018, contrariamente agli italiani. La popolazione rumena presenta un rischio di ricovero per abuso di alcol/farmaci e disturbi mentali organici indotti circa doppio rispetto alla popolazione italiana. Le donne provenienti dal Marocco hanno sperimentato il parto cesareo con complicanze all’incirca quattro volte di più rispetto alle donne italiane.

CONCLUSIONI: l’analisi dei dati di routine mette in evidenza eccessi di ospedalizzazione per alcune cause e per Paesi di provenienza, facendo emergere come un approccio real-world possa essere utile e tempestivo alla messa in atto di strategie preventive per specifiche patologie in aree territoriali definite.

Parole chiave: immigrati, ospedalizzazione, disuguaglianze, real-world evidence

INTRODUCTION

Migration is a complex and multifactorial phenomenon demanding a system analysis which goes beyond demographic and economic considerations. Indeed, increasing migratory flows are a public health challenge. Beginning from the Nineties, increasing migratory flows towards Italy have intensified the presence of foreign citizens following a trend that will continue in the next years.¹ At the beginning of 2019, foreigners residing in Italy were 5,255,503, which represents a 2.2% increase compared to the previous year, and amounted to 8.7% of the resident population.² It is a significant proportion of the population whose health profile and access to health services are different from those of the Italian population, which must be taken into consideration by the National Health Service (NHS).³⁻⁵ Thus, it may be difficult to meet the health needs of the foreign population not only for a different distribution of risk factors, but also for a different relationship with the health system, due to cultural, religious, and linguistic aspects.⁶ Cultural and linguistic difficulties could be an obstacle to access to health services even with a universal health system, such as the Italian one. In spite of this large number of refugees living in the country, there is a lack of understanding of health status and health needs of this vulnerable population.⁷ The “National Health Interview Surveys” (NHIS; 2005 and 2013) and the ad hoc interview surveys “Social conditions and integration of foreign citizens in Italy” (2011-2012), implemented by the Italian National Institute of Statistics (Istat), offered a wide range of information about health conditions and accessibility to health services of immigrants in Italy. In particular, NHIS, a survey based on samples of about 60,000 families for a total of almost 120,000 individuals, allowed to analyse changes in health conditions over the years and to make comparative analyses between foreign citizens and Italians.⁸ Between 2001 and 2013, the Italian network of the Longitudinal Metropolitan Studies (IN-LiMeS), focusing on foreigners coming from high migratory pressure countries (HMPC), showed excess hospitalisation for some causes and countries of origin. Moreover, IN-LiMeS showed that adult immigrants are at higher risk of undergoing hospital admissions that could be avoided through appropriate outpatient care.⁹ In addition to these studies, the use of current data, such as hospital discharge data (HDD),^{10,11} can be useful to identify health problems of a population and preventive strategies, particularly at local level. The flow of information of the HDD is a tool for collecting information on hospitalisations and represents a source of real-world data. Real-world data can be defined as data relating to a patient health status or the delivery of health care routinely collected from a variety of sources, such as HDD and administrative data.¹² Evidences obtained from real-world data provide useful information on therapeutic development, outcomes research, patient care, health care systems, qual-

ity improvement, safety surveillance, and well-controlled effectiveness studies.^{13,14} For this, real-world evidence can provide an overview of the actual state of health of a population. The aim of this real-world study is to evaluate whether the analysis of the causes of hospitalisation is a useful tool to characterize the differences in health conditions of foreigners residing in the Local Health Unit n.1 of the Abruzzo Region (LHU 201). A special consideration is given to the significant demographic changes in this territory as a consequence of the earthquake of April 2009, with an increased presence of foreigners due to the post-seismic reconstruction processes.¹⁵

METHODS

STUDY DESIGN

This was a retrospective study on hospital discharges data collected by the LHU 201 (L'Aquila Province), one of the four Health Units Abruzzo Region is divided into. Abruzzo is a Southern Italy region whose population size is 1.2 million individuals.¹⁶

DATA COLLECTION

Hospital discharge data (HDD) for all causes, spanning a 9-year period (2010-2018), collected on the population of the LHU 201 were analysed. HDD were identified from hospital discharge forms (HDFs) and the QUANI-SDO software (<http://www.bim.it/new/index.php>) was used to select individual anonymous records, which included age, gender, birthplace, date of admission and discharge, type of admission (ordinary or day hospital), Diagnosis-Related Group (DRG) and Major Diagnostic Categories (MDC) codes.¹⁷ The following MDC codes were investigated because of their relation with unhealthy behaviours and social determinants:

- MDC 14 “Pregnancy, Childbirth, and Puerperium”;
- MDC 20 “Alcohol/Drug Use or Induced Mental Disorders”;
- MDC 21 “Injuries, Poison, and Toxic Effect of Drugs”;
- MDC 24 “Multiple Significant Trauma”.^{18,19}

Data refer to hospital discharges and not to patients; then, if a person was re-admitted during the considered period, he/she was counted more than once. A patient was defined as immigrant if his/her birthplace was different from Italy.

OUTCOME MEASURES

The main outcome was to analyse the trend of HDDs by MDC and birthplace. The secondary outcome was to investigate Standardized Hospitalisation Rates (SHRs) by specific MDC.

STATISTICAL ANALYSIS

The jointpoint regression model was used to analyse the time trend (2010-2018) of Crude Rate of hospitalisation (x100) and the annual percentage changes (APCs), related to Immigrant and Italian population resident in the LHU

201.^{20,21} The crude rate was calculated with the following formulas:²³

$$\text{Crude rate for 100 Immigrants} = \frac{\text{Immigrants Discharges in LHU 201}}{\text{Resident Foreigners LHU 201}} \times 100$$

$$\text{Crude rate for 100 Italians} = \frac{\text{Italian Discharges in LHU 201}}{\text{Resident Italians LHU 201}} \times 100$$

The final models were selected using the Permutation Test and data were treated using log transformation. The APC in each joinpoint segment represents the rate of change in crude hospitalisation rate per year and it is calculated using generalized linear models assuming a Poisson distribution, fitting a linear regression to the natural logarithm of the annual rates using the calendar year as the predictor variable.²² Changes in rates include shifts in magnitude or direction where a positive APC indicates an increase in hospitalisation rate for a given segment, while a negative APC indicates a decrement of hospitalisation. The discharges of immigrant population were analysed from 2010 to 2018 by ten MDC codes and five birthplaces (Romania, Morocco, Ukraine, Macedonia, and Albania) sorted by frequency. To analyse demographic inequalities, SHRs with 95% CIs were calculated. SHR was calculated as the ratio of the observed number of immigrants' discharges to the expected number of discharges, using indirect standardization method. The Italian population and the LHU population were defined according to Istat. The analysis was performed using StataMP 14 software and Joinpoint Regression Program, Version 4.8.0.0. April, 2020; Statistical Research and Applications Branch, National Cancer Institute.

RESULTS

The LHU 201 reported an average assisted population of 300,000 subjects (citizens and foreign residents) during the study time. The hospital care is organised with four hospitals to admit patients from three different geographical areas: Aquilana, Marsicana, Peligno-Sangrina (figure 1). Using QUANY-SDO software, 711,728 records were selected from 2010 to 2018, related to HDD registered in Abruzzo Region. Then, 385,440 records were selected from LHU 201. Finally, a total of 26,570 HDD collected from 2010 to 2018 on the immigrant population with birthplace different from "Italy" were analysed. The average age of immigrants was 40±16 years and average hospital stay was 4±7 days. Immigrants were mainly from Europe (64%) and from Africa (17%). Their distribution in the year 2018 is showed in figure 2.

As reported in figure 3, there was a join point for the Italian population trend with a significant APC of -1.56 (p<0.05) from 2010 to 2015, and a positive APC of 1.54 from 2015 to 2018. The trend of rates x100 immigrants was significantly negative from 2010 to 2018 with a significant ACP of -4.18.

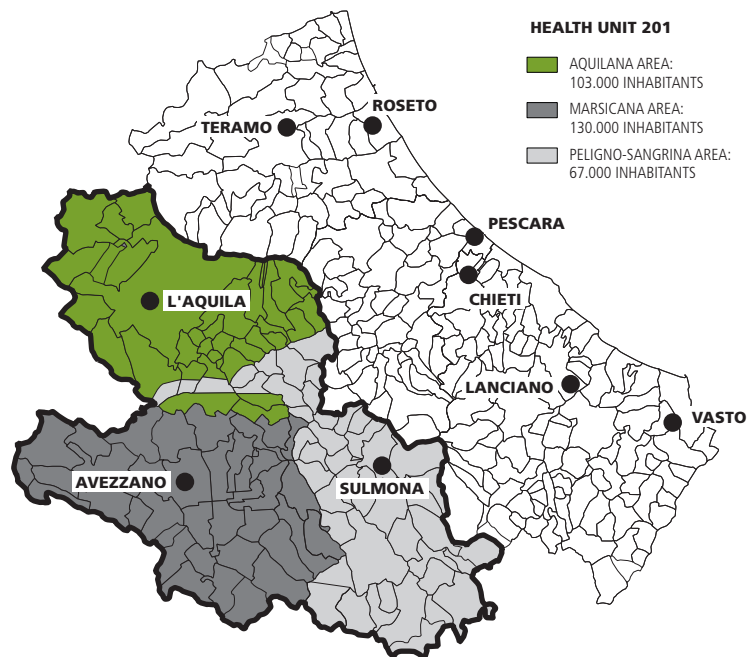


Figure 1. Local Health Unit 201 of Abruzzo Region (Southern Italy).
Figura 1. ASL 201 della Regione Abruzzo.

The analysis by MDC sorted by frequency, showed that the discharges with MDC code 14 ("Pregnancy, Childbirth and Puerperium") were the highest over time, with a decrement of -19% from 2010 to 2018, as shown in table 1. Analysing the MDC code 14 by birthplace, the prevalent discharges were from the same five countries from 2010 to 2018, with an increment from 2010 to 2018. People of Romanian (-26%), Ukrainian (-65%), and Macedonian (-56%) nationality reported the greatest reduction, while Moroccans (+40%) reported an increase (figure 4).

The analysis of the four indicators chosen to plan and organise preventing strategy indicated that women from Morocco and Macedonia experimented the caesarean section or vaginal delivery with complications more frequently than Italian women (figure 5).

As reported in figure 6, the hospitalisation for "Alcohol/Drug Use or Induced Mental Disorders" was significantly higher in immigrants from Romania.

The analysis of hospitalisation rates for "Multiple Significant Trauma" showed that adult population from Romania reported SHRs significantly lower than Italian adult population.

CONCLUSIONS

Analysing real-world data can provide an overview of the distribution and of the health needs of a population. In particular, hospital discharge data were used to assess trends and geographic variation in occurrence of selected disease in the foreign population of the considered LHU.²³ Since 2010, there has been an increase in the foreign population with different distribution according to nationality (for example, Moroccan people grew, while Romanian people are stable since 2012). In addition, the proportion of African people rose from 15% in 2010 to 23% in 2018.

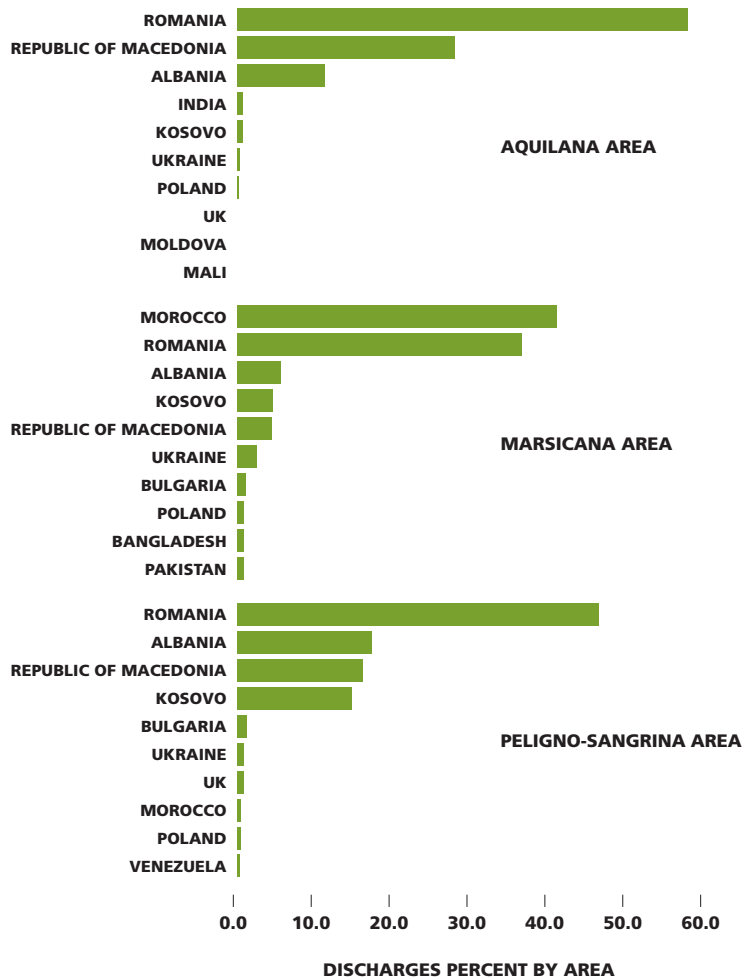
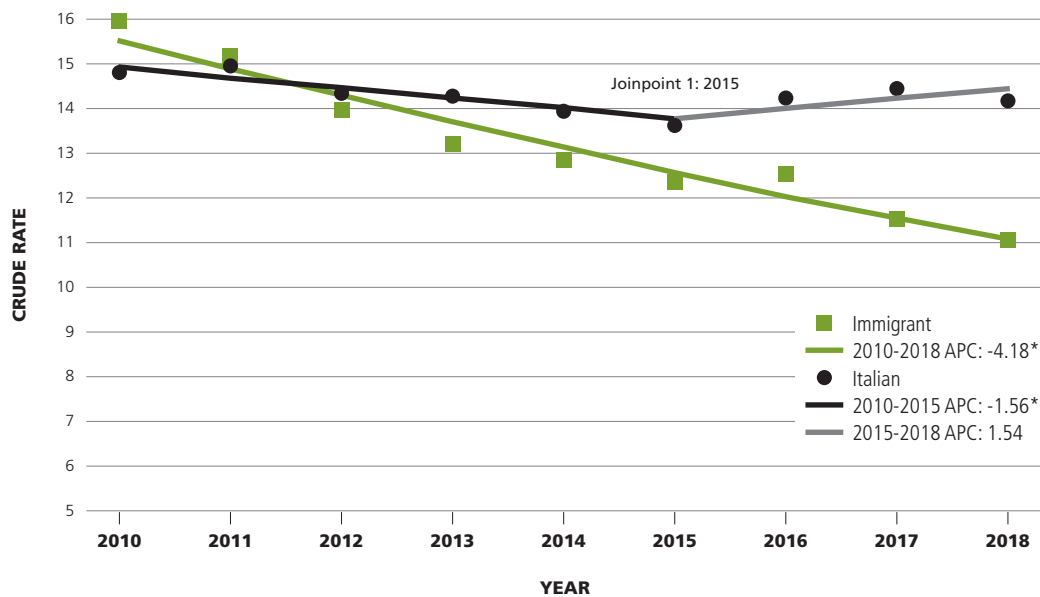


Figure 2. Immigrant discharges, by geographical area of Local Health Unit 201 (Abruzzo Region, Southern Italy). Years 2010-2018.
 Figura 2. Dimissioni degli immigrati per area geografica della ASL 201 della Regione Abruzzo. Anni 2010-2018.



* Indicates that the Annual Percent Change (APC) is significantly different from zero at the alpha = 0.05 level. / Indica che la variazione percentuale annua è significativamente diversa dallo zero ad alfa = 0,05. Final selectet model: immigrants – 0 jointpoints; Italians – 1 jointpoints. Rejected parallelism. / Modello finale selezionato: immigrati – 0 jointpoint; italiani – 1 jointpoint. Parallelismo rifiutato.

Figure 3. Trend of hospital discharge data: immigrants versus Italian residents in Local Health Unit 201 (Abruzzo Region, Southern Italy). Years 2010-2018.
 Figura 3. Andamento delle dimissioni: residenti immigrati e italiani nella ASL 201 della Regione Abruzzo. Anni 2010-2018.

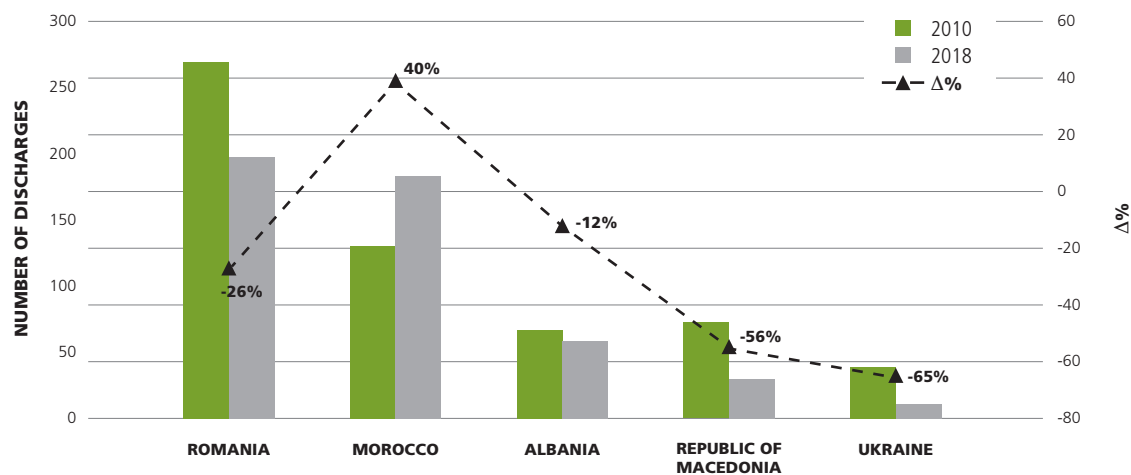


Figure 4. Discharges of the major diagnostic category code 14, by the first five countries and changes from 2010 to 2018 ($\Delta\%$) in Local Health Unit 201 (Abruzzo Region, Southern Italy).
Figura 4. Dimissioni per categoria diagnostica 14 per i primi cinque Paesi e le variazioni dal 2010 al 2018 ($\Delta\%$) nella ASL 201 della Regione Abruzzo.

Knowing the distribution of the foreign population is essential to better address cultural and linguistic issues. In fact, several studies have shown that these problems could affect people's health obstructing access to treatment or causing inappropriate treatment.²⁴⁻²⁶ An increase in foreign residents is reported during the considered period and a significantly negative trend in hospitalisation rate for immigrants was found, especially since 2013; these results confirm the national trend of reduction of trend in hospitalisation rate, although discharge here reported in 2016 were higher than those reported in other studies.¹⁹ Probably, the cause of this difference is to be partly found in the use of birthplace instead of citizenship to define the foreign population. However, in the Italian population, there was a reduction in discharges until 2015, then a positive trend in hospitalisation rate from 2015 to 2018 was observed. These results are surprising and far from the national trend,²⁷ but it will be necessary further investigation to find the causes of the phenomenon.

The analysis here presented shows that the main cause of hospitalisation is childbirth, followed by muscular, bone and connective tissue disorders, probably attributable to working conditions. Infectious diseases account only for 1.64% of total admissions. Analysing hospitalisation rates for alcohol/drug use or induced mental disorders, it was found that Romanian people have a risk of hospitalisation more than twice higher than Italian resident population (SHR: 2.40; CI95% 1.69 - 3.31). Moroccan women experience caesarean section with complications 4.88 times more than the Italian population, and Macedonians 3.84. Similarly, the hospitalisation for the caesarean section without complications is greater for all the nationalities considered except Ukraine, especially Morocco (SHR: 4.47; CI95% 3.95 - 5.04). In conclusion, the results here presented show that immigrants in the province of L'Aquila (LHU 201) present pathologies whose

frequencies differ in relation to the immigrant community they belong to.

Therefore, with respect to a future develop of a real-world evidence approach, monitoring current data can be a useful tool to identify the health needs of the population in different areas. For example, the Marsicana" area of the province of L'Aquila has a greater presence of Moroccan people and, on the basis of these results, they could benefit from an improvement of the family planning centres in order to reduce admissions by caesarean section; these data should be integrated with another important instrument to monitor maternal health, such as Delivery Certificates (CedAP). In the same way, in the areas Aquilana and Peligno-Sangrigna, which have a greater presence of Romanian people, the Services for Drug Addiction should be strengthened in order to reduce admissions for drug or alcohol use.

Furthermore, HDD may serve as one of the few available data sources to track and monitor a population health conditions, particularly where disease registries cannot be established. However, it is necessary to take into account that errors or biases in coding of hospital records may result in misclassification of diseases or other discrepancies. In addition, in this study birthplace was adopted as inclusion criterion instead of citizenship, because of missing data or inappropriate codes in HDD analysed.²³

The Authors hope that in the future this flow of administrative data will be a valid source of information to identify the best prevention strategies for the population.

Considering the limitations of the research, the lack of a stratification by gender for the considered outcomes is reported. However, an evaluation of effect sizes for gender differences may be a future study. Another limitation of this study is that the considered data sources take into account the born aboard resident population which is regularly registered, so excluding irregular and non-resident immigrants. Regular residents remain the major compo-

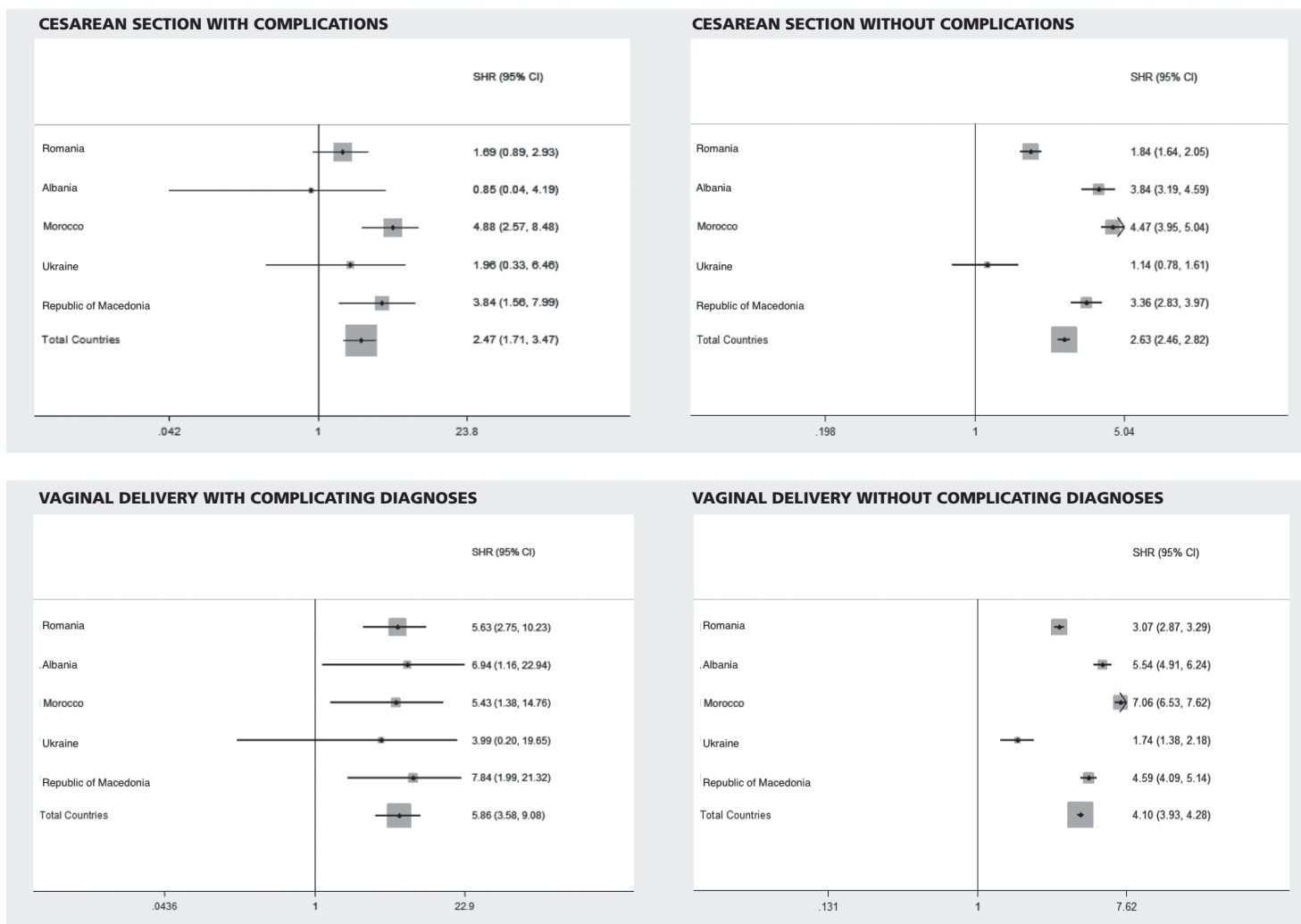


Figure 5. Major diagnostic category code 14 "Pregnancy, Childbirth, and Puerperium" in Local Health Unit 201 (Abruzzo Region, Southern Italy). Years 2010-2018.
 Figura 5. Categoria diagnostica 14 "Gravidanza, parto e puerperio" nella ASL 201 della Regione Abruzzo. Anni 2010-2018.

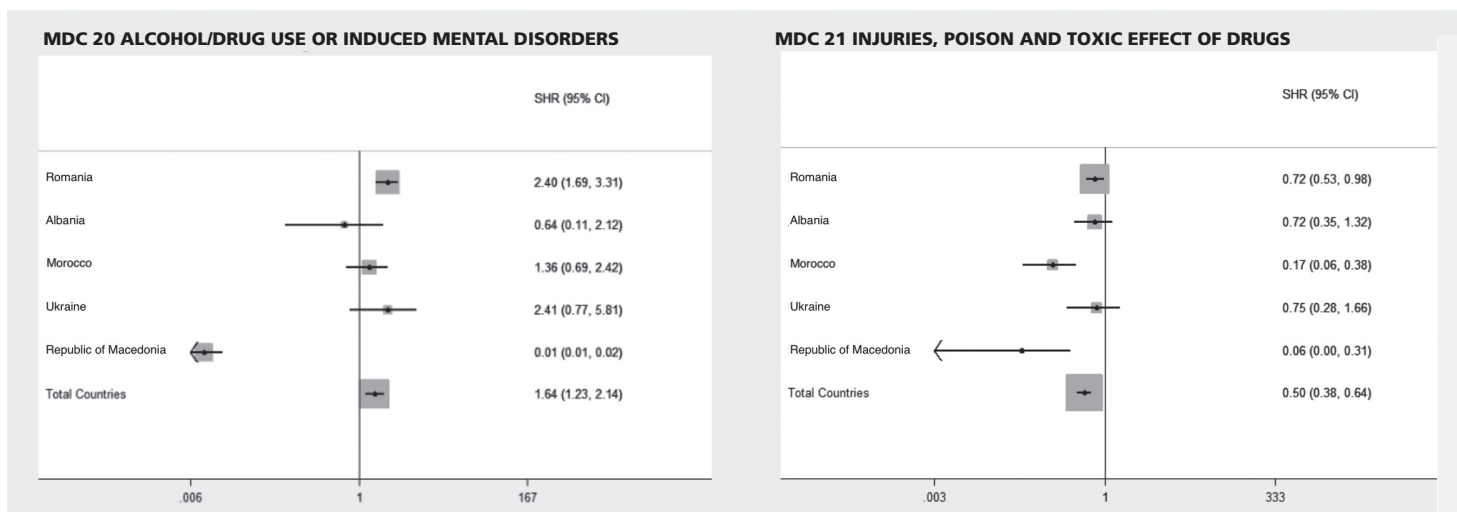


Figure 6. Major diagnostic category code 20 "Alcohol/Drug Use or Induced Mental Disorders" and code 21 "Injuries, Poison, and Toxic Effect of Drugs" in Local Health Unit 201 (Abruzzo Region, Southern Italy). Years 2010-2018.
 Figura 6. Categoria diagnostica 20 "Abuso di alcol/droghe e disturbi mentali organici indotti" e categoria diagnostica 21 "Traumatismi, Avvelenamenti ed Effetti Tossici dei Farmaci" nella ASL 201 della Regione Abruzzo. Anni 2010-2018.

MAJOR DIAGNOSTIC CATEGORY	2010	2011	2012	2013	2014	2015	2016	2017	2018	Δ (%)
FEMALES										
MDC-14 "Pregnancy, Childbirth, and Puerperium"	859	876	948	880	846	802	820	759	699	-18.6
MDC-8 "Musculoskeletal System and Connective Tissue"	147	152	155	174	175	205	156	193	150	2.0
MDC-13 "Female Reproductive System"	219	293	254	357	345	332	332	220	240	9.6
MDC-6 "Digestive System"	97	105	115	125	143	127	135	131	117	20.6
MDC-5 "Circulatory System"	93	90	85	93	100	88	82	100	66	-29.0
MDC-1 "Nervous System"	70	69	84	64	86	68	96	87	96	37.1
MDC-7 "Hepatobiliary System and Pancreas"	74	63	79	84	100	76	86	100	100	35.1
MDC-3 "Ear, Nose, Mouth, and Throat"	64	58	55	58	63	69	47	57	68	6.3
MDC-4 "Respiratory System"	38	35	41	39	53	60	66	58	58	52.6
MDC-11 "Kidney and Urinary Tract"	46	37	44	38	62	50	54	54	72	56.5
MALES										
MDC-8 "Musculoskeletal System and Connective Tissue"	131	143	144	149	169	142	154	136	126	-3.8
MDC-6 "Digestive System"	88	132	110	151	138	115	156	141	123	39.8
MDC-5 "Circulatory System"	36	64	55	71	77	67	68	72	74	105.6
MDC-1 "Nervous System"	56	51	70	66	71	60	89	82	73	30.4
MDC-7 "Hepatobiliary System and Pancreas"	42	35	48	54	44	47	39	32	54	28.6
MDC-3 "Ear, Nose, Mouth, and Throat"	54	61	59	60	59	46	54	50	60	11.1
MDC-4 "Respiratory System"	35	49	40	45	71	50	63	59	61	74.3
MDC-11 "Kidney and Urinary Tract"	40	33	52	63	64	46	48	66	52	30.0

Table 1. Hospital discharges in immigrant population, by ten major diagnostic category (MDC) codes in Local Health Unit 201 (Abruzzo Region, Southern Italy). Years 2010-2018.

Tabella 1. Dimissioni ospedaliere della popolazione immigrata per dieci codici diagnostici (MDC) nella ASL 201 della Regione Abruzzo. Anni 2010-2018.

ment among immigrants and the most stable in the territory, albeit with different levels of social integration. Although HDD is a useful source of information to identify target populations for primary prevention interventions, such data are limited: integration with other information contained in the clinical record, such as CedAP, with respect also to social aspects, would be desirable to plan specific preventive actions or to make health care more ac-

cessible. Furthermore, this study confirms that the use of HDD can be important to examine relevant topics in public health and that HDD are currently a routine source of information available to produce real-world evidence estimating the burden of health conditions on the health system.

Conflict of interest: none declared.

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