

# Differences in the use of involuntary admission across the Veneto Region: which role for individual and contextual variables?

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**Aims.** The first aim of this study is to compare involuntary admissions across the Veneto Region in Italy. The second aim is to explore the relation between mental health services provision, characteristics of population, individual factors and involuntary admissions.

**Methods.** For 21 Mental Health Departments (MHDs) in the Veneto Region (Italy), the average population prevalence rate of involuntary admissions between 2000 and 2007 and the percentage of involuntary admissions were calculated. Chi-square tests for equality of proportions were used to test hypotheses. Variables at the individual, contextual and organisational levels were used in multiple regressions, with the involuntary admission data as dependent variables.

**Results.** The average prevalence rate of involuntary commitment was 12.75 ranging from 1.96 to 27.59 across MHDs. About 75% of the involuntary admissions referred to psychotic patients, and almost half of patients were aged 25–44. Significant differences among MHDs emerged; higher percentages of involuntary admissions were generally found in densely populated areas. Higher ageing indices and rates of social workers were found as predictors of the prevalence rate. In the multilevel regression, being males and psychotic significantly increased involuntary admissions, while the percentage of singles in population decreased it.

**Conclusions.** This study contributes to define the specific contribution of each factor predicting the use of involuntary admission, even within areas under the same legislation. It shows how the inclusion of both individual and contextual factors may lead to better predictions and provides precious data for the services improvement.

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**Key words:** Compulsory admission, involuntary admission, multilevel logistic regression, psychiatric hospital discharge.

## Introduction

The high number of involuntary admissions of people with mental disorders constitutes a major public health issue and a contested topic, taking also into account the ethical and personal relevance of compulsory admission for the patients' quality of life (Kallert *et al.* 2008; Lay *et al.* 2012). The rates of involuntary admission of people with mental illnesses are widely considered to be an indicator for the legal framework of mental health care across Europe (Salize & Dressing, 2004), and they are also used as an indicator of quality of mental health care for the appropriateness of care in many international evaluation systems. For example the 'Canadian Institute of Health Information Health Indicators Framework for health

system performance' reported that the need to minimise unnecessary detention and to provide appropriate treatment, supervision and protection for persons with serious mental illness is a key system goal (Canadian Federal/Provincial/Territorial Advisory Network on Mental Health, 2001).

Most empirical research has evaluated involuntary admissions related to kind and severity of mental illnesses or sociodemographic factors. Not only patients with schizophrenia and other psychotic disorders, but also those with organic mental disorders and substance use disorders, males and immigrants report higher involuntary admissions rates, as well as people with a lower socio-economic status (Salize *et al.* 2002; Lay *et al.* 2011; Hustoft *et al.* 2013). However, differences emerged among countries. As for foreigners, for example, a previous Italian study did not find higher rates of involuntary treatment in immigrant patients as compared with Italian-born patients (Tarsitani *et al.* 2012).

There is still no clear picture on the factors explaining differences in involuntary admission, even within a given country. Some studies have touched upon the

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idea that services characteristics affect the use of involuntary admissions (Huxley & Kerfoot, 1993; Wierdsma & Mulder, 2009; Lay et al. 2011). For example, some of the service quality components are associated with the rate of compulsory psychiatric admissions (Bindman et al. 2002). Recent Norwegian studies (Myklebust et al. 2014) found that patients from a deinstitutionalised system were more likely to be involuntarily admitted than the ones in the locally institutionalised service-systems. Other studies have shown a strong interest in studying the association between deinstitutionalisation, decrease of bed ratios, development of community care and involuntary admissions percentages. For example, in England the rate of involuntary admissions per annum increased by more than 60%, whereas the provision of mental illness beds decreased by more than 60% over the same period, with bed reductions preceding increases in involuntary admissions (Keown et al. 2011). With introduction of the Mental Health Act in 1978, a shift towards community psychiatric care has been seen in Italy, but despite the reduction in the number of psychiatric beds available after the implementation of the Act, National statistics from 1979 to 1997 reported that the total number of compulsory admissions has remained substantially stable, while its proportion decreased (Guaiana & Barbui, 2004). Moreover, Emons et al. (2013) suggested that the demographic environment variables could play an important role for the explanation of the involuntary admission variance in a region.

Given this framework, the first aim of this study is to compare the rate of involuntary admissions across the 21 Mental Health Departments (MHDs) of the Veneto Region in Italy. The second aim is to explore the relation between aspects of mental health services provision and population and patient characteristics on the one side, and involuntary admission rates on the other. We hypothesised differences within the Region even if the same involuntary admission regulations and policies apply to all MHDs. Individual variables together with services organisation could have a major role in explaining the variability in the use of involuntary admission.

## Methods

### Setting

In accordance with the Italian Mental Health legislation (1978), mental health care in Italy is organised on a district model (Local Health District – LHD). Every LHD is served by a MHD, which supplies a wide range of well-integrated hospital and community services in a geographically well-defined area. This study was conducted in the 21 MHDs of the Veneto Region (North East of Italy, 4 832 340 inhabitants and

a population density of 265 inh/km<sup>2</sup> in 2007). Data were collected from the 40 acute inpatient wards. All of the hospital discharge records that contained a psychiatric diagnosis between 2000 and 2007 were selected from the regional health information system (Regione Veneto, 2010). Day hospital discharges were excluded to deal with a homogeneous sample of data.

### The Italian Law

The Italian Reform Law No. 180 marked the transition from a hospital-based system of care to a model of community psychiatry. The criteria for involuntary admission are: (a) an emergency intervention is needed; (b) the patient refuses treatment; and (c) alternative community treatment is impossible. The Law states that compulsory admissions need to be formally authorised by the Mayor of the Municipality where the patient live and can be only undertaken in acute psychiatric wards (15 beds maximum) located in public general hospitals (Amaddeo et al. 2012).

### Variables

Variables at different levels of analysis were used.

*Individual-level variables*, referred at time of discharge, as age (grouped into four categories: <25, 25–44, 45–64, 65+), gender, diagnosis-related group (DRG) and patient's MHD, were all obtained from the Regional Health Information System. DRGs classification, adopted in many countries, summarises different patients treated by hospitals into a number of clinically meaningful and economically homogeneous groups, facilitating comparisons of hospital costs and quality. DRGs are performed by computerised grouping software taking into account modifications of the International Classification of Diseases (WHO, 1992; Busse et al. 2011). In this study, the 19th HCFA-DRG version (2006) was used (Pertile et al. 2011). DRGs from 424 to 433 were selected based on ICD-9-CM diagnoses: depressive neuroses (labelled as 'Affective disorders'), disorders of personality and impulse control (labelled as 'Personality disorders'), psychoses (labelled as 'Psychosis'), operating room procedure with principal diagnoses of mental illness, acute adjustment reaction and psychosocial dysfunction, neuroses (except depressive), organic disturbances and mental retardation, childhood mental disorders, other mental disorder diagnoses, alcohol/drug abuse or dependence (labelled as 'Other diagnosis').

*Area-based level variables* referred to the characteristics of the area covered by each MHD during 2007. These measures include:

- The staff endowment (number of psychiatrists, psychologists, nurses, social workers, rehabilitation

therapists, educational workers and other workers) calculated as percentage on total staff and population rate and obtained through an *ad hoc* survey carried out by the Regional Office for Health Planning and Management.

- Variables related to the health system provision and utilisation (the number of patients with outpatient contacts per 1000 residents in the population; the average number of contacts per patient and the population rate of beds in residential facilities and of places in day-care centres), using data from the Regional Psychiatric Outpatient Care Database.
- The resident population structure by age (the *ageing index*, as the population aged 65+ divided by the one under 15 multiplied by 100; the *dependency ratio*, as the population aged either at least 65 or below 15 divided by the number of the population aged 15–64, multiplied by 100); by marital status (the rate of people who are either divorced or widowed and the one of single people) and by ethnicity (the rate of people without the Italian citizenship), collected from the National Institute of Statistics (ISTAT, 2007).
- The level of urbanisation, based on the classification created by the European Commission (Eurostat Labour Market Working Group, 2011) which distinguishes three types of areas at the LAU2 level (Local Administrative Unit consisting of municipalities or equivalent units in the EU Member States): densely, intermediate and thinly populated areas. In this study, each LHD was categorised as either densely populated or not.

### Statistical analysis

For each MHD, the total number of hospital discharge records and the number of involuntary admissions between 2000 and 2007 have been calculated, together with its average prevalence rate per 100 000 adult inhabitants across the 8 years of analysis, and the percentage of involuntary admissions on the total number of admissions.

Chi-square tests for equality of proportions have been applied to evaluate homogeneity across MHDs, with respect to both the prevalence rate of involuntary admissions per population in each year between 2000 and 2007 and their percentage over the total number of admissions. The same tests have been applied on the base of the urbanicity level, to evaluate the hypothesis that differences across MHDs could be imputed to their contextual characteristics. Moreover, the test for equality of proportions has been carried out also within each MHD to evaluate homogeneity of prevalence rates across years, and across diagnoses, gender and age groups, to test the equality of percentages over the total number of admissions. Finally, a test for linear trend in

proportion has been applied both on yearly prevalence rates and on the percentage of involuntary admissions.

As for socio-demographic (age and gender) and clinical (diagnosis) variables, their distribution has been calculated both for all patients and for the ones undergoing involuntary admission. Moreover, the rates of beds and of foreigners on total population (in year 2005 and 2007, respectively) have been measured, together with the percentage of involuntary commitments on the total number of admissions for each diagnostic group. Variability across MHDs both in the percentage of involuntary admissions and in the average prevalence rate has been assessed for all patients and for each diagnostic group via the coefficient of variation.

Then, regression analyses have been performed. In particular, a multiple linear regression has been implemented for the average prevalence rate across years 2000–2007, using MHDs as units of analysis, area-level variables as regressors and weights proportional to the corresponding adult population. Finally, a multiple logistic regression with a random effect for MHD has been realised, using single admissions in the period as units, and both individual and area-level variables as regressors. In both cases, variables significant in simple regressions (or in their multilevel counterparts, for the case of single hospitalisations) have then been considered for the multiple regressions, and a backward stepwise selection (using the 5% significance level for variables removal) has been applied to select the variables for the final regressions.

The predictive power of such regressions and the contribution of each of their components to it have been evaluated by calculating the Adjusted- $R^2$  in the case of the linear regression, and the area under the ROC curve (AUC) for the logistic regression. The latter quantity corresponds to the probability that the regression allocates to a randomly chosen positive instance (in this case, involuntary admission) a higher probability than a randomly chosen negative one.

Statistical analyses were performed using Stata 13.1 (StataCorp, 2013) and R 2.13.0 (R Development Core Team, 2011).

### Results

Between 2000 and 2007, 75 614 hospital discharge records and 3980 involuntary admissions were registered in the Veneto Region from all acute inpatient wards at the general hospitals. We were not able to locate 214 admissions (five involuntary) in an MHD and 469 admissions were deleted as we were not able to determine whether they were involuntary or not.

The average prevalence rate of involuntary admissions per 100 000 adult inhabitants considering all years and all MHDs was 12.75.

The most frequent diagnosis among admissions was psychosis (58.71%), followed by ‘other diagnosis’ (20.56%), affective disorders (12.60%) and personality disorders (8.14%). Such unbalanced distribution across diagnoses is even more pronounced if we consider involuntary admissions alone, with 75.25% of psychosis, 15.10% of ‘other diagnosis’, 8.64% of affective disorders and only 1.01% of personality disorders. The majority of patients undergoing admissions were females (51.98%), while the majority of involuntary admissions occurred to male patients (56.23%). The age distributions related to admissions and to involuntary admissions alone were almost equal: almost half of the patients were in the age-group 25–44 (48.91% of admissions and 49.17% of involuntary admissions), followed by patients aged 45–64 (33.22, 33.92%, respectively), while only a minority of patients were in the age-groups 15–24 (7.37 and 6.56%, respectively) and 65 or older (10.51 and 10.35%, respectively).

**Time trend in involuntary admission**

The test for trend has not reached significance ( $p$ -value = 0.179) when performed on the percentages of compulsory commitments while it has turned out to be significant ( $p$  = 0.023) in the case of the prevalence of involuntary commitment: the average rate for the first 4-year period is 13.23, whereas it is 12.29 for the year range 2004–2007, thus highlighting a decrease in the use of compulsory commitment across the time-range considered.

However, the MHDs show a heterogeneous behaviour, with ten of them also showing significant differences across years with respect to population rates of involuntary admissions, but no common trend among MHDs. For this reason, we considered in the following analysis the average rates of involuntary admission in the years range 2000–2007.

**MHDs comparison**

Comparing MHDs, results highlight huge differences within the Veneto Region: as for average prevalence rate of involuntary admissions, with four MHDs showing a value above 20, nine between 10 and 20 and eight MHDs below 10; with respect to the percentage on total number of admissions, with one MHD below 1%, 11 between 1 and 5%, eight cases between 5 and 10% and even one MHD with more than 10% of involuntary admissions on the total number of admissions. The rate of involuntary admissions per population in each year and (both for the whole dataset and for each diagnostic group) their percentage over the total number of hospitalisations showed significant differences across MHDs ( $p$  < 0.001).

Descriptive statistics are reported in Table 1, highlighting large ranges: 1.96–27.59, in the yearly average prevalence rates of involuntary admissions; 0.57–12.38, in their percentage on total number of admissions across MHDs. Nevertheless, differences across large and small MHDs in the percentage of involuntary admissions have turned out to be non-significant. However, as for prevalence rates for each year, significant results arose for years 2000, 2002 and 2007 (in year 2000, even after adjusting for multiple comparison with the Bonferroni correction). In particular, densely populated areas showed an average prevalence rate per 100.000 adults of 13.73, while such rate in smaller areas is 12.08.

Differences across diagnoses and gender in the percentage of involuntary admissions emerged ( $p$  < 0.001), whereas not for age groups ( $p$  = 0.234). As for diagnoses in particular, they ranged from 0.65% in case of personality disorders, to 6.78% in the case of psychosis, with intermediate values for patients with affective disorders and those with ‘other diagnosis’. Taking a look at the coefficients of variation, it turns out that, for both variables related to the use of involuntary

**Table 1.** Involuntary admission by diagnostic groups referred to the 21 Mental Health Departments in the Veneto Region (2000–2007)

	Average population rates of involuntary admissions					Percentage of involuntary admissions on total number of admissions				
	Min	Median	Max	Interquartile range	CV	Min	Median	Max	Interquartile range	CV
Psychosis	1.71	8.38	20.05	4.60	69.37	1.07	6.00	13.42	4.91	45.99
Affective dis.	0	1.16	2.87	0.89	84.31	0	3.54	13.25	2.65	75.54
Personality dis.	0	0.07	0.44	0.17	117.58	0	0.31	2.67	1.09	125.65
Other diagnoses	0.15	1.48	6.31	2.39	84.12	0.16	3.64	10.60	3.70	68.22
All patients	1.96	11.75	27.59	9.59	69.42	0.57	4.76	12.38	4.15	49.91

commitments, the highest variability across LHDs was among patients suffering from personality disorders, while the most homogenous group turned out to be the one suffering from psychosis.

### Regression analysis

Explanatory variables considered for the regressions are both at the individual and at the area level (with the former only used in the regression with individual binary variable for involuntary admission as outcome). Simple linear regressions have identified, as variables significantly correlated with the average prevalence rate, the ones related to social workers (both their percentage on the total staff, and their rate on adult population), the rate of nurses and the ageing index. The stepwise procedure identified two predictors: an increase of 1% in the ageing index is estimated to lead to an increase of 0.09 in the average prevalence rate across the 8-year period, while a much larger effect is found for social workers, with an increase in their rate leading to a three times and a half bigger increase in the outcome. The Adjusted- $R^2$  has been calculated, with both regressors showing they can predict a relevant part of variance in the outcome. Table 2 shows the outcomes of the regression on average prevalence rate and the Adjusted  $R^2$ .

With respect to the individual binary variable for involuntary admissions, coefficients turning out to be significant in simple multilevel regressions are the ones related to the percentage of singles on adult population, gender and diagnosis. Such variables remain all significant when included together. The final multilevel logistic regression identifies being males and suffering from psychosis as individual predictors of involuntary admissions, while, for area-level variables, a negative effect is found for the percentage of people who never married.

Differences across diagnoses have already been described above. As for the other variables, their product-moment correlation with the binary variables for admission is always significant ( $p < 0.001$ ), with a correlation coefficient of  $-0.056$  for the percentage of singles, and a Phi coefficient of  $0.039$  for gender (as seen above, with male patients being more likely than female patients to undergo a compulsory admission).

Finally, considering the AUC, the inclusion of contextual-level variables (the percentage of singles in the whole population) leads to an improvement from the 0.5 in case no model is adopted (the random classifier situation) to 0.589. The whole contextual part (including the random effect for LHD) increases the AUC to 0.661. Such measure of the predictive power of the model is finally increased to 0.702 by the inclusion of variables at the individual level. Table 3 shows the outcome of the regression and the values of the AUC related to the indicator for involuntary admission.

### Discussion

This study used the hospital discharge cards of all acute inpatient psychiatric facilities in the Veneto Region of Italy to analyse and describe the use of involuntary admissions. Involuntary admissions in the whole Region are 5.3% of all admissions, and the majority of involuntary admitted are male patients with a diagnosis of psychosis.

Among patients' individual characteristics, the multi-level regression analysis confirms the role of gender and diagnosis: involuntary admissions increased for male patients and for patients with psychosis. Concerning these variables, the results confirm the international literature (Salize *et al.* 2002; Hustoft *et al.* 2013). Psychosis is the most frequent diagnosis among the involuntary patients and the most homogeneous diagnosis across the MHDs. Psychosis is also one of the main diagnoses included in laws and regulations as the most basic prerequisite for involuntary admission in many European countries; however, the presence of about 25% of patients involuntary admitted with a different diagnosis than psychosis is due to the fact that in Italy no descriptions or definitions of diagnosis are provided by the law. In particular, MHDs reported a different attitude in compulsory admission of patients with personality disorder. Moreover, despite the dangerousness criterion is not requested in the Italian Law, the male prevalence of involuntary admission seems similar to the results from countries where this criterion is reported (Hustoft *et al.* 2013).

No other patient's variables resulted significant and therefore the role of other individual variables reported in the international literature is not confirmed.

**Table 2.** Regressions of prevalence rates of involuntary admissions on contextual-level variables (2000–2007)

	Coefficient	<i>p</i> -value	Confidence interval	Adjusted $R^2$
Rate of social workers	3.487	0.021	(0.598, 6.376)	0.329
Ageing index	0.092	0.042	(0.004, 0.180)	0.281
Global model				0.441

**Table 3.** Multilevel Logistic Regression of admissions on individual- and contextual-level variables

Binary variable for involuntary admission 2000–2007	Coefficient (reported as odds ratio)	p-value	Confidence interval
Percentage of singles on population (Contextual variable)	0.893	0.017	(0.814, 0.980)
Gender (RC: male)			
Female	0.720	<0.001	(0.675, 0.769)
Diagnosis (RC: psychosis)			
Affective disorders	0.496	<0.001	(0.442, 0.557)
Personality disorders	0.112	<0.001	(0.082, 0.153)
Other diagnosis	0.564	<0.001	(0.515, 0.618)
Area under ROC curve			
Only singles	0.589		
Only contextual part	0.661		
Global	0.702		

RC = Reference Category.

The average involuntary admission rate (12.75/100 000) is comparable with the one reported for Trieste, Portogruaro and Pordenone (12.4/100 000 inhabitants) (Zinkler & Priebe, 2002; Fiorillo *et al.* 2011); lower than the one reported both for Italy in the PROGRES study (24/100 000) (de Girolamo *et al.* 2007) and for the Emilia Romagna Region (18.14/100 000) (Priebe *et al.* 2005); extremely low in comparison with the results reported in other European regions which showed high variability in rates: from 6 (in Portugal) to over 200 (in Finland) per 100 000 inhabitants per year (Salize & Dressing, 2004; Fiorillo *et al.* 2011).

A possible time trend in the prevalence of involuntary commitment emerged in the Veneto Region. However, such trend does not seem to be linear, and only a closer inspection highlights a general decrease in time in the rates of involuntary admissions. Moreover, the percentage of involuntary admissions on all hospitalisations remained stable as both the absolute number of admissions and the one of involuntary admissions decreased. Differently, the previous analysis for Italy found a decrease of the proportion of compulsory admissions from 17.1 to 10.6% in the period 1979–1997, while their absolute number remained stable (Guaiana & Barbui, 2004). However, these results are in contrast to the involuntary admission rates increase in some Western European countries (Keown *et al.* 2011).

Looking at MHDs, the hypothesis of differences across MHDs has been tested highlighting a large variability within the Veneto Region, with the average prevalence rate of individual admissions in the 8-year period being 14 times higher in the MHD with the highest value than in the one with the lowest

rate. Such variability confirms the importance of investigating which contextual level characteristics are associated with variables related to involuntary admission.

The hypothesis that differences across MHDs could be imputed to their size has been tested. Indeed, wards in urban areas used coercion measures more frequently and patients living in urban areas are more likely to suffer from drug, homelessness and isolation problems (Husum *et al.* 2010). However, non-significant results have been found in the case of the percentage of involuntary admissions, while, for some years of the time range here studied, a significant association between prevalence rates and the urbanicity level arose, with generally higher rates being found in urban areas. Among other characteristics of the MHD areas ageing index turned out to predict the use of involuntary admission and percentage of singles negatively affected the predicted percentage of involuntary admissions even taking into account patient-level variables.

As for the characteristics of the services, the results in the Veneto Region described a non-significant association between provision of community services (i.e., beds in residential non-hospital facilities and places in day-care centres) and involuntary admissions. However, looking at staff provision, it seems that the amount of some professional figures affected the number of involuntary admissions, as already suggested for restraint practice (Bowers *et al.* 2012; Luciano *et al.* 2014).

In particular, involuntary admissions increased with the increasing of social workers in the MHD. Looking at the international literature, in agreement with our results, in UK variations in involuntary admissions resulted related to the availability of approved social

workers (Huxley & Kerfoot, 1993). Nevertheless, the UK is the only European country that gives social workers a prominent role in the assessments for compulsory admission to psychiatric hospital (Webber & Huxley, 2004). In Italy, the role of social workers is not strictly connected to involuntary admission procedures, as only the medical doctor assesses patients for involuntary admission criteria. A possible explanation of the results found in the regression at the MHD level, is that a major presence of social workers in the services is translated into a major detection of the crisis situation in the community and higher social control. Indeed, in Italy social workers are professionals whose work is most linked with other health and non-health agencies for care. For this reason they could primarily be contacted for situations that require involuntary admission. As a further possible explanation, it has to be considered that the rate of social workers shows a higher variation across MHDs than the ones of other professionals that are most likely to affect the number of involuntary admissions, i.e., doctors and nurses, thus leading to more precise estimates.

However, a deeper analysis and further studies are needed to better explain this result, possibly with the inclusion of relevant staff-related factors such as attitudes and thoughts (Husum *et al.* 2010; Luciano *et al.* 2014).

In general, our findings pointed out that services organisation and structure of the multidisciplinary teams other than patients' individual characteristics play a role in predicting involuntary admission and their knowledge could increase the explained variance of related regression models. The total variance explained by our contextual model is above 40%. Moreover, the regression on the individual level shows an acceptable discriminating power between individuals who undergo involuntary admission and those who do not, with randomly taken pairs of involuntary and non-involuntary admissions showing a higher predicted probability for the case of the patient actually committed in over 70% of instances. However, while the predictive power on the patient level is necessarily limited, improvements could possibly be obtained with the inclusion of further individual variables, presumably linked to past psychiatric history.

The present study has some limitations. The data of the regional register, being routine collected administrative data, allow only limited conclusions because there is only limited information concerning the history of a patient's admission to the psychiatric hospital or his/her illness and the data are referred to patient cases, which means that one patient might appear several times in the data if he or she had been re-admitted during the study period. Data have been collected between 2000 and 2007 and are therefore quite old, however not relevant organisational, legislative or sociodemographic

changes likely to affect the use of involuntary admission have occurred in MHDs afterwards. The investigated region covers only a part of North of Italy (8.02% of the global national population); consequently the generalisability of the results is limited. Moreover, even if the involuntary admission law is implemented at the national level, many differences emerged across Italian regions, as can be noticed by looking at the nationwide PROGRES-Acute project results, which provided qualitative-quantitative information about care facilities (de Girolamo *et al.* 2007). Indeed, each MHD in the Veneto Region generally presented low involuntary admission percentages and rates as compared with the corresponding national values. Further study should clarify whether more comprehensive and wider epidemiological models, including public attitudes towards restrictions on people with mental disorders (Angermeyer *et al.*, 2014), could be used to predict involuntary admission in inpatient psychiatric services in other regions or in the whole country.

Studies like ours permit to inform decision makers on involuntary admission differences at the regional level and our results confirm the necessity to routinely monitor and evaluate quality of care; not only at the regional/national level but also at the local level. The results on the role of individual and contextual predictors in influencing involuntary admission could be used for organising services.

The wide differences within the Veneto Region suggest that a discussion and knowledge sharing between mental health professionals (including social workers) could help to identify good practices that allow preventing compulsory admissions. In some areas, organisation of services or psychoeducational interventions could be improved with the specific aim of reducing levels of compulsory admission or preventing them.

Finally, involuntary admission issues have a role in terms of health care costs (Lay *et al.* 2012). For this reason, our results are relevant also for Regional budget allocation as patients with a compulsory admission had a significantly longer length of stay than those with planned admission (Pertile *et al.* 2011).

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