

Comparison of restraint data from four countries

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Social Psychiatry and Psychiatric Epidemiology

DOI:

[10.1007/s00127-016-1203-x](https://doi.org/10.1007/s00127-016-1203-x)

Published: 01/09/2016

Peer reviewed version

[Cyswllt i'r cyhoeddiad / Link to publication](#)

Dyfyniad o'r fersiwn a gyhoeddwyd / Citation for published version (APA):

Lepping, P., Masood, B., Flammer, E., & Noorthoorn, E. O. (2016). Comparison of restraint data from four countries. *Social Psychiatry and Psychiatric Epidemiology*, 51(9), 1301-1309. <https://doi.org/10.1007/s00127-016-1203-x>

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Comparison of restraint data from four countries

Abstract

Background: Previous studies comparing restraint data from different countries had to rely on randomly published data and showed wide variance in the prevalence of restraint between countries.

Aim: To systematically compare datasets from four similar European countries with regards to restraint prevalence

Methods: We analysed whole country or area datasets on restraint from Wales, Ireland, Germany and the Netherlands systematically, thus excluding selection, patient and setting bias. Learning disability (LD) and forensic settings were analysed separately. Differences in proportions between countries were tested by means of chi square, with number of admissions, admission days and catchment area as denominator and counts of restraint as numerators.

Results: Full data sets were obtained allowing calculations of total admissions, total restraint numbers, numbers of patients involved and total occupied bed days. Data for Ireland is from 2012 and from 2013 for the other three countries. The percentage of patients exposed to restraint varies between 4.5 and 9.4 %. The average number of restraints per patient is stable at around 3 in all countries. Patient numbers affected by restraint per 100 occupied bed days per month vary between 0.095 and 0.200. The Netherlands have the highest use of seclusion (79%), the longest restraint times and low use of enforced medication. Wales the lowest use of seclusion (2%), followed by Ireland (29%) and Germany (49%). Events per 100 admissions per month vary between 17 and 21. Patients affected by restraint per 100 admissions per month vary between 5.4 and 7.5. LD services account for a disproportionately high number of restraint events.

Conclusion: Patient related restraint data are remarkably similar between countries. Type and length of restraint still vary significantly.

Keywords: Seclusion, Restraint, Overview, Comparison, Standard national figures

Introduction

Coercion and restraint of patients is common in medical, surgical and psychiatric healthcare settings^{1,2}. Figures for coercion and the use of restraint are commonly collected on psychiatric wards in a number of countries, but comparisons or benchmarking are rare. The available data have so far revealed considerable differences between countries with regards to when, how, how often and how long patients are restrained; the best evidence is available for Europe^{3,4}. Part of the policy for the use of restraint in many countries is the documentation of restraint incidents and analysis of these data. However, most countries have no centralised agency collecting and analysing the available data, which rarely gets published at all. There are concerted efforts to reduce restrictive practice interventions⁵, but comparative data for bench-marking purposes are lacking.

In 2010, Steinert et al published a systematic review showing data from 12 countries⁶. All the data was from very limited studies with small samples. Types of restraint counted typically include physical restraint (holding and immobilising), mechanical restraint (mostly with belts), seclusion and involuntary medication. Noorthoorn et al found data from 18 studies in an updated search⁷. Most sample sizes were below 1000 patients, few had data from more than one hospital or region. The data showed wide variations in the way data were captured and published as well as wide variations in the prevalence and length of coercive measures. The EUNOMIA project arguably provided the best coercion data from a single study in ten European countries⁴. It showed significant differences between countries in the prevalence of coercion as well as patient characteristics (male, psychotic) that influenced coercion. However, even this study only provided point prevalence data from a very limited number of hospitals in the participating countries⁴. Since then, a study from Hong Kong was published adding the first data from an Asian country, but confined to an acute admission ward⁸. No data for whole countries or even regions within countries have ever been compared internationally. Very few of such data sets exist worldwide. In the Netherlands, Ireland and the Southwest of Germany nationwide or region-wide data collection has existed for some years for benchmarking purposes with occasional publication of data^{7,9,10,11,12}. In Wales, data have recently been collated for a benchmarking exercise¹³. A report by the UK mental health charity MIND showed wide variations between mental health care providers in England and Wales. However, the data were gathered by means of Freedom of Information requests and not put into any comparative context or analysed systematically^{14,15}. Whilst this survey may have been of limited scientific quality, publications from Germany, Wales and the Netherlands suggest that differences between hospitals in the same countries or regions are significant. The size of the variance in these studies was up to 10-fold, for some measures in the Netherlands even up to 20-fold⁹⁻¹².

In their 2010 systematic review, Steinert et al suggested a number of statistical analyses that should routinely be applied in order to allow meaningful international comparisons ⁶. The analyses are analogous to the reporting of aggressive incidents suggested by previous researchers ¹⁵. This way of analysing data was used successfully to analyse Dutch restraint data ^{9, 16}.

The chosen statistical calculations in the current study are designed to take into account differences in the number of admissions, settings, occupancy on individual wards, and the possibility of few patients being restrained multiple times. They include the following:

1. Events per 100 admissions per month
2. Patients affected by restraint per 100 admissions per month
3. Events per 100 occupied bed days per month
4. Events per 100,000 population per year
5. Patients affected by restraint per 100 occupied bed days per month
6. Average number of restraints per affected patient
7. Percentage of patients exposed

In order to get a more comprehensive view of restraint in a wider population across large areas we have compared restraint data from Wales, Ireland (Republic), the Netherlands and Southwest Germany (where electronic data are being collected) as close to 2013 as possible. 2014 data will not become available until later in 2015 or 2016. The four countries were chosen because of the availability of whole country or whole region data. Findings from a recent study ⁹ show coercive measures differ across ward types. For this reason, forensic and learning disability wards were analysed separately. Variation in figures between hospitals is large, up to 10 and even 20 fold, depending on the measure studied.

The following paragraphs describe the data collection in each of those four areas covering a population of approximately 26 million:

Wales: Data on restrictive physical interventions (RPI) are routinely collected by Health Boards in Wales. RPI is defined in Wales as “direct physical contact between persons where reasonable force is positively applied against resistance, either to restrict movement or mobility or to disengage from harmful behaviour displayed by an individual” (WAG Framework for restrictive physical intervention 2005). There is a statutory obligation to collate and record data as laid down by NICE Guidelines ¹⁷, Department of Health guidelines, Mental Health Code of Practice and Welsh Government Publications ¹⁷⁻¹⁹. Restraint in Wales is mostly physical restraint, either to manage aggression or to give involuntary medication. Seclusion is rare. If physical restraint is needed to initiate seclusion or to give medication it is

counted as one restraint incident. Responsibility for the data collection and analysis is with each individual Health Board. Although the interpretation of definition of restraint is broadly similar across Wales, it is thought that there is a difference in interpretation between learning disability (LD) and other psychiatric services in particular. In learning disability services some Health Boards count any physical contact including any type of mild touching, which potentially skews the results significantly in those Health Boards. The study was therefore designed to collect data for adult, old age, LD and forensic services separately. Data recording can be considered as highly accurate. The six Health Boards are responsible for the overwhelming majority of psychiatric care in Wales.

The Netherlands: In the Netherlands, providing data on coercive measures has been obligatory by law since 2013. Measures recorded include seclusion, mechanical and physical restraint, involuntary medication, and involuntary feeding. Seclusion is defined as bringing the patient into a locked room where he/she is alone and able to move freely but unable to leave due to a locked door. Mechanical restraint refers to the use of belts, bed grids or protection blankets to fix the patient to the bed. Physical restraint refers to immobilizing the patient by means of physical force. Involuntary medication is defined as application of medication by force where the patient shows overt resistance. Of the 87 services that cater for admissions under mental health legislation, 66 provided data to the national database in 2013. In the current calculations data were included from 37, mostly large mental health facilities, representing a national coverage of 95% of all admissions, as well as an estimated coverage of 98% of all coercive measures. The database included figures from child psychiatry facilities, facilities for the elderly as well as forensic wards. Data from specialist LD services are not yet included. The accuracy of the data reporting was very good when it was formally tested ¹⁶.

Germany: The Centre for Psychiatry Südwestfalen and its affiliates is a psychiatric organization providing inpatient psychiatric care for a catchment area of about 2 million inhabitants of nine counties in South West Germany. It also provides psychiatric care for patients detained under mental health legislation. For six counties, the centre is the only provider, in two counties there are also university hospitals providing inpatient care. For one county, the Centre only provides inpatient care for children and adolescents. The Centre for Psychiatry Südwestfalen operates an extensive electronic database of routinely collected clinical information containing information on the use of seclusion and restraint. It includes exact data on the duration of each measure, collected according to clear definitions. As in the Netherlands, seclusion is defined as bringing the patient into a locked room where he/she is alone and able to move freely but unable to leave due to a locked door. Mechanical restraint refers to the use of belts, bed grids or protection blankets to fix the patient to the bed. According to internal hospital policies, patients have to be constantly and personally

monitored during mechanical restraint. Involuntary medication is defined as application of medication by force or by definite psychological pressure. The data on coercive measures can be considered highly accurate due to the legal obligations of documentation.

Republic of Ireland: Since 2006, the Mental Health Commission (MHC) in Ireland receives quarterly figures for various data types from all approved mental health facilities, in accordance with a standardised form. The data included the only one forensic facility in Ireland. Periodic reviews occur by the MHC of all approved centres to cross check figures received, with figures gathered by MHC Inspectors at the approved centres. For this purpose the inspectors compare patient notes with data provided, and lastly in 2012 ²⁰, good recoding adherence was found. There is one approved centre listed for learning disability care, although there are a number of long stay learning disability facilities that are not listed and therefore did not contribute data to the national survey. The MHC defined mechanical restraint, physical restraint and seclusion. Restrictive interventions/restrictive practices are all use of mechanical restraint, physical restraint and seclusion. Mechanical restraint is “the use of devices or bodily garments for the purpose of preventing or limiting the free movement of a patient’s body”. The use of bed rails or cot sides is excluded from the definition. Physical restraint is “the use of physical force (by one or more persons) for the purpose of preventing the free movement of a resident’s body when he or she poses an immediate threat of serious harm to self or others”. This may be done to manage aggression or to administer involuntary medication. Restrictive interventions/restrictive practices for the purpose of this report include the use of mechanical restraint, physical restraint and seclusion. Seclusion is “the placing or leaving of a person in any room alone, at any time, day or night, with the exit door locked or fastened or held in such a way as to prevent the person from leaving”. If a patient needs physical restraint in order to be secluded this may be counted as two separate events.

Methods

We collected the newest possible restraint data from the four countries mentioned and analysed restraint data for comparison. The aspects of restraint required for analysis were:

1. Number of admissions per year.
2. Total number of restraint incidents.
3. Mean time of restraint (in minutes). These were separated into seclusion times and non-seclusion restraint such as physical restraint with or without enforced medication.
4. Total number of patients affected.
5. Total number of occupied bed days.
6. Total population served.

This allowed the calculation of seven accepted calculations: events per 100 admissions per month, patients subjected to restraint per 100 admissions per month, average length of intervention (in minutes), events per 100 occupied bed days per month, patients subjected to restraint per 100 occupied bed days per month, average number of restraints per affected patient, and number of restraints per 100,000 population per year. These seven calculations were done for all four countries, with and without LD patients, and, wherever possible, separate for forensic settings. Differences between countries were tested by means of chi square statistics on proportion variables. Significant differences are highlighted underneath the tables.

Results

Full data sets were obtained from all four participating countries, which allowed calculations of total admissions, total restraint numbers, numbers of patients involved and total occupied bed days. The most recent available data was 2012 for Ireland and 2013 data for the other three countries. The Welsh data lacked some specific data on forensic admissions. We calculated figures of restraints and patients affected, both per 100 admissions per month, and per 100 occupied bed days per month. Admissions and occupied bed days are often implicated in numbers of restraints as they are influenced by ward activity and occupancy. Table 1 shows the results including forensic and LD services data. Table 2 shows results without LD services, and with and without forensic services separately.

Speciality settings:

In Wales, LD services significantly skew the figures, largely because of the different way reportable incidents get interpreted. This makes direct comparisons with other country's data difficult, because many minor coercive events are counted as well. Wales does not have a high secure forensic hospital. The total Welsh forensic admissions were 105, with 73 reported restraints and 11 patients affected. However, one Health Board could not provide specific forensic data, and therefore all Wales data for forensic services could not be calculated reliably. With an estimated 20,333 forensic bed days in 2013 the incidents figures are rather low, reflecting the long-stay nature of many of the facilities.

In the Netherlands, incidents rise significantly when forensic patients are included (with LD). The events per 100 admissions per month increase from 18.73 to 24.48 including forensic patients. Patients affected by restraint per 100 admissions per month rises from 7.45 to 8.10. Events per 100 occupied bed days per month rise marginally from 0.293 to 0.299. Only Patients affected by restraint per 100 occupied bed days per month reduces from 0.095 to

0.092, presumably reflecting the long-stay nature of forensic patients. The average number of restraints per affected patient increases slightly from 2.84 to 2.98. The percentage of patients exposed rises slightly from 9.5% to 9.9% when forensic patients are included. All these figures include LD patients. Furthermore, the length of restraint measures in the Netherlands is by far the longest of the four countries surveyed. A recent study⁹ associates the particularly high length of restraint in the Netherlands with the Dutch mental health legislation, which regulates admission rather than (enforced) treatment, and with the fact that instigating enforced treatment is excessively administratively burdensome in comparison.

In Southwest Germany and Ireland, there are similar differences also seen in the Netherlands when forensic patients are included. On the whole, however, the German data shows more incidents with fewer patients. The events per 100 admissions per month increase from 26.15 to 31.36 when forensic patients are included. Patients affected by restraint per 100 admissions per month rises from 4.95 to 5.27. Like in the Netherlands, events per 100 occupied bed days per month rise marginally from 0.866 to 0.893. Patients affected by restraint per 100 occupied bed days per month reduce from 0.200 to 0.175, presumably reflecting the long-stay nature of forensic patients. The average number of restraints per affected patient rises from 2.09 to 3.55. The percentage of patients exposed rises slightly from 4.51% to 5.21% when forensic patients are included, which is significantly lower than in the Netherlands. In Ireland the differences are more marginal because there is only one forensic unit for the whole country but the tendencies are the same.

In all countries LD services account for a disproportionately high number of restraint events. All variables rise in all four countries when LD services are included. The lowest increase in restraint figures when LD services are included is in the Netherlands. There are only marginal increases with regards to: events per 100 admissions per month, events per 100 occupied bed days per month, and patients affected by restraint per 100 occupied bed days per month. However, for the Netherlands, only standard Mental Health care facilities (which provide some LD services) provided data, whereas the specialist centres for LD are yet to be included. In Wales, LD restraint events make up 50% of all recorded restraints for the reasons already outlined. In Ireland, LD services make up 11% of all restraints. In the Netherlands, only 4% of the restraints are from LD patients, but in this country only a small number of LD patients are treated in non-specialist hospitals. In Germany, 14% of restraints are from LD services, which is more in keeping with the Irish data. Forensic patients were more often secluded than other patients in the Netherlands, Ireland and Germany. No data were available from Wales in that respect. In the Netherlands the percentage of seclusion as the reported restraint went up from 79% to 82% when forensic patients were calculated in. In Germany seclusion went up from 49% to 58%, in Ireland from 28.5% to 29.4%.

Discussion

Differences in seclusions and physical restraints (restrictive practice interventions) are shown to be due to different types of restraint culture, specialties, ward types, bed occupancy, admission levels and demographic profiles of patients^{5,22-25}. Other influences may include differing policies and training. Previous data comparisons have always shown big differences in the prevalence of restraint between countries^{4,6,8}. In contrast to this, and for the first time ever, our data showed that average restraint data from four European countries with similar social and health structures shows remarkably similar results with regards to many parameters around the number of patients subjected to some form of restraint. These countries are similar in the sense that they have a comparable Gross Domestic Product, similar health care spending per capita, a comparable western society with a degree of individualisation, but also different mental health legislation regulating coercive measures. The countries have broadly similar numbers of psychiatric beds per capita, although Germany and the Netherlands have relatively more psychiatric beds than Wales and Ireland (see below for details). All four countries have extensive social security systems and provide psychiatric care to the entire population, as health insurance is almost ubiquitous and health care virtually free at the point of need.

In the current study we confirmed the usefulness of the analysis methodology suggested in earlier publications in order to make clinically meaningful comparisons and recommend their further use. Events per 100 admissions per month, patients affected by restraint per 100 occupied bed days per month, and patients affected by restraint per 100 admissions per month are virtually the same in all four countries. The length and type of coercive measure is, however, very different between these four countries. In the Netherlands, seclusion is still responsible for the vast majority of restraints, whereas it is rare in Wales where physical restraint is the most common form of coercion. In Ireland, seclusion makes up about a third of restraints, in Germany about half. This explains the short duration of restraint in Wales compared to the other countries. It is, however, remarkable that Wales (limited data) and Germany clearly have much shorter seclusion times than Ireland and the Netherlands. This confirms previous results from the Netherlands showing long seclusion times^{6,5,14}. The percentage of patients affected by coercion is surprisingly low and remains below 10% in all surveyed countries, even when taking into account LD and forensic services. However, whilst Wales, Ireland and Germany have almost exactly the same figures (around 6%); the Netherlands have over 9% of patients exposed to restraint. The average number of restraints per patient is around 3 in all countries (not counting LD services). The number of admissions per 100,000 population is lowest in Wales (350), higher in Ireland (396) and in the Netherlands (431) and much higher in Germany (805). This is, of course, related to the

availability of psychiatric beds²¹, which sees the Netherlands and Germany ranked numbers 3 and 4 out of 35 OECD countries for psychiatric bed availability, whilst Ireland is ranked 17th and the UK 21st (Wales has the lowest number of psychiatric beds per 100,000 population within the UK).

The data show that the Netherlands have the longest average length of stay followed by Ireland, Wales and Germany. When we leave out LD patients, we again observe the same order in length of stay. In which way longer admission duration may be related to a higher chance of being restrained is subject for further investigation, but in any case a longer admission increases exposure time. It is therefore even more remarkable that most averaged patient related figures are similar.

In summary, our data suggests significantly higher restraint and much higher seclusion numbers per admission, per patient and per capita in the Netherlands compared to the other countries. The numbers of restraint per admission was higher in Germany than in the other countries. Germany and Wales showed significantly higher event rates. Excluding the forensic patients, we showed the same differences and similarities. In short, in some of the indicators some countries show higher figures than others, while the same countries show low figures on other indicators. In the end, the results were still much more similar than expected. Over the last years, especially in the Netherlands and Germany, the use of coercive measures has been subject to extensive political discussion and media coverage. In contrast to Wales and Ireland, in the Netherlands and Germany legal restrictions have led to a reluctance in treatment, and subsequent prolonged restraint use, both seclusion and mechanical restraint⁷. In the Netherlands this was an effect of a gradual process after the implementation of the current Mental Health Act in 1994. As the law made the use of enforced medication subject to extensive procedures, a gradual decrease of the use of involuntary medication was observed, accompanied by an increase in the use of seclusion until 2006. After 2006, a nationwide program was implemented, which aimed at the reduction of seclusion use and led to a slight, but significant reverse of these trends²⁵. In Germany, between the end of 2012 and the first half of 2013 the use of involuntary medication was unlawful in a number of federal states. The impossibility to use medication against a patients' will resulted in a steep increase in aggressive incidents, mechanical restraint and seclusion use²⁶.

When we compare the mental health legislation in the countries studied, we observe some important differences. In all countries, coercive measures are the means of last resort in dealing with aggression by patients. However, there are significant procedural and legal differences when it comes to enforced medication and treatment against the patient's will. In the Netherlands, the law requires extensive administrative procedures before enforced

medication can be applied. In Germany, federal state mental health legislations leave the decision on the use of enforced medication to the treating psychiatrist together with a legal representative. The treating psychiatrist may be held accountable in hindsight, thus there may be some reluctance in providing enforced treatment. In Ireland and Wales, the law is largely comparable and less restrictive with regard to the autonomy of the treating psychiatrists.

Publications from Germany, Wales and the Netherlands suggest that variance between hospitals may be greater than variance between countries. The size of the differences between hospitals within the same country or region were up to 10-fold, for some measures even up to 20-fold⁹⁻¹². The important question is therefore, why variance *within* countries outweighs any variance *between* countries, and why intercultural differences may be much less significant than previously believed.

In most countries there is currently no central agency responsible for overseeing standardised data collection, data interpretation and activity monitoring. This may be one aspect in explaining why there is such a variance between hospitals in levels of restraints. A centralised agency or single data collecting method with relevant criteria may help in providing more uniform and usable data. This is already happening to a degree in the Netherlands and the Republic of Ireland. In Germany, from 2016, the provision of data on coercive measures to a central agency will be mandatory in the South Western federal state of Baden-Württemberg. Strategies have been applied in Germany to use benchmarking processes in order to reduce coercion. They found a positive trend towards a small reduction in coercive measures when benchmarking results were regularly discussed. However, they also reported a regression to the mean, indicating that additional strategies are necessary to get to a position of “learning from the best”¹¹. The so called “Six Core Strategies” model and the “Safe wards” strategy has been adopted in some countries with early successes but long-term data are missing^{5,22}.

Strength and limitations: The main strength of this study is the comprehensiveness of the data, the accuracy of the collected data, and the rigour of the comparative analysis. These data are truly comparable because they cover most admissions and restraints in the countries surveyed. They also deal with potential bias arising from ward occupancy, patient type or setting. However, limitations still exist because we were unable to capture 100% of the countries and areas included. This is because data from a small number of statutory services and private hospital providers were not available. This makes figures estimating the number of restraints per 100,000 most unreliable. We calculated those figures between 97 and 252. This compares unfavourably to data from 10 countries collected between 1999 and 2001 which shows figures between 31 and 218²². However, these figures were collected with a far worse capture of total

restraints in each of the countries surveyed, and any assumption that restraint rates may have gone up are likely to be a misinterpretation.

Conclusion

Restraint figures from four European countries with similar social and health structures are remarkably similar with regards to patients affected by restraint. Big differences exist with regards to the type and length of coercive measures used. The statistical methods of comparing restraint data used in this paper provide clinically meaningful comparisons. Data comparisons between similar countries are useful to describe differences in practice. However, mere comparisons may not necessarily yield clinically useful solutions for the reduction of restraint. In the future, efforts should focus on evidence-based research to successfully reduce coercive measures and restraint. It may be possible to generalise results within similar health systems, given the similarities of the data we found.

Acknowledgement: We'd like to thank Prof Tilman Steinert, Prof Tom Palmstierna and Prof Raveesh BN for their helpful comments.

Table 1 Results including LD and forensic services

Country	Wales	Ireland	Netherlands	Southwest Germany
Total admissions ^{a,b} (per 100,000)	10842 (349.7)	18172 (396.0)	72250 (430.6)	16970 (804.7)
Total restraints ^a	3735 (2.5% seclusion)	3991 (31.4% seclusion)	17694 (81.6% seclusion)	5322 (59.7% seclusion)
Patients affected ^b	582	1080	5882	977
Average time (min)	8.5 for all restraints combined (from 5 out of 6 Health Boards), 108 for seclusion for 1 Health Board	322 for all restraints combined (7.2 for physical restraint , 1078 for seclusion)	5782 for all restraints combined including mechanical restraint (4931 seclusion only)	496 for all restraints combined including mechanical restraint (495 seclusion only)
Total occupied bed days	504960	868700 (assumes 100% occupancy)	5897923	511591
Mean admission duration (days)	46,6	47,8	81,6	30,1
Catchment area ^{a,b}	3,099820	4,588252	16,780000	2,108730
Events per 100 admissions per month ^c	33.65	24.57	24.48	31.36
Patients affected by restraint per 100 admissions per month	5.37	6.04	8.10	5.76
Events per 100 occupied bed days per month ^c	0.681	0.460	0.302	1.040
Events per 100,000 population per year	120.45	97.31	105.45	252.38
Patients affected by restraint per 100 occupied bed days per month	0.115 (without LD, results with LD cannot be calculated)	0.119	0.092	0.191
Average number of restraints per affected patient	6.09	4.07	2.84	3.63
Percentage of patients exposed	5.37 (without LD, results with LD cannot be calculated)	6.04	9.9	5.76

^a The number of restraint per admission ($\chi^2 = 511.5$; $p < 0.0001$) and per capita of catchment area ($\chi^2 = 455.3$; $p < 0.0001$) in the Netherlands was significantly higher than in the other countries.

^b The number of affected patients per admission ($\chi^2 = 213.9$; $p < 0.0001$) and per capita ($\chi^2 = 3882.4$; $p < 0.0001$) in the Netherlands was higher than in the other countries. The percentage of patients affected was also higher in the Netherlands ($\chi^2 = 180.9$; $p < 0.0001$).

^c The number of events per 100 admissions ($\chi^2 = 180.5$; $p < 0.0001$) and per 100 occupied bed days ($\chi^2 = 296.5$; $p < 0.0001$) was higher in Wales and Germany than in Ireland and the Netherlands.

Table 2: Results without LD and both with and without forensic services, forensic data for Wales could not be separated

Country All Figures without LD	Wales (2013 data with forensic patients)	Ireland (2012 data without forensic patients)	Ireland (2012 data with forensic patients)	Netherlands (2013 data without forensic patients)	Netherlands (2013 data with forensic patients)	Southwest Germany (2013 data without forensic patients)	Southwest Germany (2013 data with forensic patients)
Total admissions ^{a, b}	10842	18107	18172	68280	70513	16083	16540
Total RPI ^a	1886 (1.7% seclusion)	3,643 (28.5% seclusion)	3991 (29.4% seclusion)	15076 (79,1% seclusion)	16958 (81.6% seclusion)	3449 (49.1% seclusion)	4453 (57.5% seclusion)
Patients affected ^b	582	1036	1080	5043	5970	796	871
Average time (min)	4.3 – 17.6 8.54 (from 5 out of 6 Health Boards)	242.4 831 seclusion, 7.5 physical restraints)	322 (1078 seclusion, 7.2 physical restraint)	5393 (4754 seclusion)	5517 (4237 seclusion)	452 (416 seclusion)	553 (567 seclusion)
Total occupied bed days	504960	834,390 (assumes 100% occupancy)	868700 (assumes 100% occupancy)	5264426	5658449	398108	498689
Mean admission duration (days)	46,5	46.6	47,8	77,1	80,2	24.7	30,2
Catchment area ^{a,b}	3,099,820	4,588,252	4,588,252	16,780,000	16,780,000	2,108,730	2,108,730
Events per 100 admissions per month ^c	17.40	20.12	21.96	18.39	23.99	21.45	26.92
Patients affected by restraint per 100 admissions per month	5.37	5.72	5.95	7.45	8.10	5.46	5.76
Events per 100 occupied bed days per month ^c	0.373	0.437	0.490	0.293	0.299	0.866	0.893
Events per 100,000 population per year	60.84	79.0	86.96	89.84	100.82	163.55	211.17
Patients affected by RPI per 100 occupied bed days per month	0.115	0.124	0.124	0,095	0,087	0.200	0.175
Average number of restraints per affected patient	3.24	3.52	3.69	3.01	3.01	2.09	3.55
Percentage of patients exposed	5.37	5.72	5.94	9.4	9.8	4.51	5.27

^a Not including forensic patients, the number of restraint per admission ($\chi^2 = 4063.4$; $p < 0.0001$) and per capita ($\chi^2 = 5620.2$; $p < 0.0001$) in the Netherlands was higher than in the other countries.

^b Not including forensic patients the number of affected patients per admission ($\chi^2 = 21.3$; $p < 0.0001$) and per capita ($\chi^2 = 139.0$; $p < 0.0001$) was higher in the Netherlands than in the other countries. The percentage of patients affected was also higher in the Netherlands ($\chi^2 = 184.3$; $p < 0.0001$)

^c Not including forensic patients the number of events per 100 admissions ($\chi^2 = 19.6$; $p < 0.005$) and per 100 occupied bed days ($\chi^2 = 313.5$; $p < 0.0001$) was higher in Germany than in Ireland and the Netherlands.

References

1. Lepping P: Violence and Aggression. In: Psychiatric emergencies, editor: Kevin Nicholls, Royal College of Psychiatrists publishing, ISBN: 9781909726307.
2. Krüger C, Mayer H, Haastert B, Meyer G. Use of physical restraints in acute hospitals in Germany: a multi-centre cross-sectional studies. 2013, Dec;50 12:1599-606
3. Steinert T, Lepping P. Legal provisions and practice in the management of violent patients. A case vignette study in 16 European countries. *European Psychiatry*. 2009 Mar;24 2:135-41
4. Kalisova L, Raboch J, Nawka A, Sampogna G, Cihal L, Kallert TW, Onchev G, Karastergiou A, Del Vecchio V, Kiejna A, Adamowski T, Torres-Gonzales F, Cervilla JA, Priebe S, Giacco D, Kjellin L, Dembinskas A, Fiorillo A. Do patient and ward-related characteristics influence the use of coercive measures? Results from the EUNOMIA international study. *Social Psychiatry and Psychiatric Epidemiology*. 2014 Oct;49 10:1619-29
5. LeBel JL, Duxbury JA, Putkonen A, Sprague T, Rae C, Sharpe J. Multinational experiences in reducing and preventing the use of restraint and seclusion. *Journal of Psychosocial Nursing and Mental Health Services*. 2014 Nov;52 11:22-9
6. Steinert T, Lepping P, Bernhardsgrütter R, Conca A, Hatling T, Janssen W, Keski-Valkama A, Mayoral F, Whittington R. Incidence of seclusion and restraint in psychiatric hospitals: a literature review and survey of international trends. *Social Psychiatry and Psychiatric Epidemiology*. 2010 Sep;45 9:889-97
7. Steinert T, Noorthoorn EO, Mulder CL The use of coercive interventions in mental health care in Germany and the Netherlands. A comparison of the developments in two neighbouring countries. *Frontiers In public health* 2, 2014, 141: 1-5.
8. Chan CC & Chung CH (2005). A retrospective study of seclusion in an emergency department. *Hong Kong Journal of Emergency medicine* 12, 1: 6-12.
9. Noorthoorn E, Lepping P, Jansen W, Hoogendoorn A, Nijman H, Widdershoven G, Steinert T. One year incidence and prevalence of coercion in the Netherlands: Dutch findings in an international perspective. *Social Psychiatry and Psychiatric Epidemiology*, 2015 Dec;50(12):1857-69.
10. Wu WWK. Psychosocial Correlates of Patients Being Physically Restrained within the First 7 Days in an Acute Psychiatric Admission Ward: Retrospective Case Record Review. *East Asian Archives of Psychiatry*. 2015 Jun;25 2:47-57
11. Steinert T, Martin V, Baur M, Bohnet U, Goebel R, Hermelink G, Kronstorfer R, Kuster W, Martinez-Funk B, Roser M, Schwink A, Voigtländer W. Diagnosis-related frequency of compulsory measures in 10 German psychiatric hospitals and correlates with hospital characteristics. *Social Psychiatry and Psychiatric Epidemiology*. 2007 Feb;42 2:140-5
12. Steinert T, Zinkler M, Elsässer-Gaißmaier HP, Starrach A, Hoppstock S, Flammer E. Long-Term Tendencies in the Use of Seclusion and Restraint in Five Psychiatric Hospitals in Germany. *Psychiatrischer Praxis*. 2015 42:377-383 [Article in German]

13. Massod B, Lepping P, Jones E, Morris M, Lewis M, MsEwan J, Sussex P, Owen G. National data on coercion in psychiatry from Wales. Audit registered with BCULHB
14. http://www.mind.org.uk/media/197120/physical_restraint_final_web_version.pdf
15. <http://www.kcl.ac.uk/ioppn/depts/hspr/research/ciemh/mhn/projects/litreview/LitRevAgg.pdf>
16. Janssen WA, van de Sande R, Noorthoorn EO, Nijman HL, Bowers L, Mulder CL, Smit A, Widdershoven GA, Steinert T. Methodological issues in monitoring the use of coercive measures. *International Journal of Law Psychiatry*. 2011 Nov-Dec;34(6):429-38
17. <https://www.nice.org.uk/guidance/ng10> (Accessed 08/07/15)
18. Department of Health (DoH). Positive and Proactive Care: reducing the need for restrictive interventions. 0DoH, April 2014 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/300293/JRA_DoH_Guidance_on_RP_web_accessible.pdf (Accessed 08/07/2015)
19. <http://www.wales.nhs.uk/sites3/Documents/816/Mental%20Health%20Act%201983%20Code%20of%20Practice%20for%20Wales.pdf> (Accessed 08/07/15)
21. The use of seclusion, mechanical means of bodily restraint and physical restraint in Approved Centres: Activities Report 2012. Mental Health Commission(Ireland) March 2014. <http://www.mhcirl.ie/File/The-Use-of-Seclusion-Mechanical-Restraint-and-Physical-Restraint-in-Approved-Centres-Activities-Report-2012.pdf> (Accessed 08/07/15)
22. <https://www.oecd.org/els/health-systems/Focus-on-Health-Making-Mental-Health-Count.pdf>
23. Bowers L, Alexander J, Bilgin H, Botha M, Dack C, James K, Jarrett M, Jeffery D, Nijman H, Owiti JA, Papadopoulos C, Ross J, Wright S, Stewart D. Safewards: the empirical basis of the model and a critical appraisal. *Journal of Psychiatric Mental Health Nursing*. 2014 May;21(4):354-64
24. Bak J, Aggernæs H. Coercion within Danish psychiatry compared with 10 other European countries. *Nord Journal of Psychiatry*. 2012 Oct;66(5):297-302.
25. Vruwink FJ, Mulder CL, Noorthoorn EO, Uitdenbroek D and Nijman HLI. The effects of a nationwide program to reduce seclusion in the Netherlands. *BMC Psychiatry* 2012, 12:231
26. Flammer E, Steinert T. Impact of the Temporary lack of Legal Basis for Involuntary Treatment on the Frequency of Aggressive Incidents, Seclusion and Restraint among Patients with Chronic Schizophrenic Disorders. *Psychiatrischer Praxis* 2014, DOI 10.055/s-0034-1370069 [Article in German].