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THE ENIGMA OF PSYCHIATRIC BED NUMBERS:
Comments from five OECD Countries

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Editor

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The Enigma of Psychiatric Bed Numbers

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The pitfalls of comparing psychiatric bed numbers across jurisdictions: lessons from Canada and Italy

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ABSTRACT

The number of psychiatric beds per capita is tracked by the Organization for Economic Cooperation and Development (OECD). Italy, a country with a low number of beds, is often cited as a model to encourage bed reductions in other countries. OECD data indicate that Canada has more than three times the number of beds compared to Italy. Yet Canada struggles to meet the demand for inpatient psychiatric care. As Italy does not appear to have a more innovative system of community psychiatric care, we wondered whether the OECD numbers might be inaccurate. To address this question, we first examined data from Canada, a country with well-developed and maintained information systems to ensure the accuracy of its bed data. We found that the number of beds reported by the Canadian Institute of Health Information (CIHI) was significantly higher than the numbers reported by the Chief of Psychiatry at each hospital in two Canadian provinces. Definition of a psychiatric bed was responsible for most of this discrepancy: especially the tendency of CIHI to count as psychiatric beds, some non-hospital based beds providing detoxification and counseling for substance abuse. Site visits to Italy identified similar definitional confusion. Beds in Italy's Residential Treatment Facilities appear to provide similar treatment to that provided in medium to long-term hospital admissions in Canada, but are not included in OECD data. Our initial assessment identified other ways in which Italy's psychiatric bed numbers appeared to be underestimated. The importance of having an accurate comparison of psychiatric bed numbers is discussed.

Keywords: psychiatric beds, psychiatric services, hospital beds, OECD health policy

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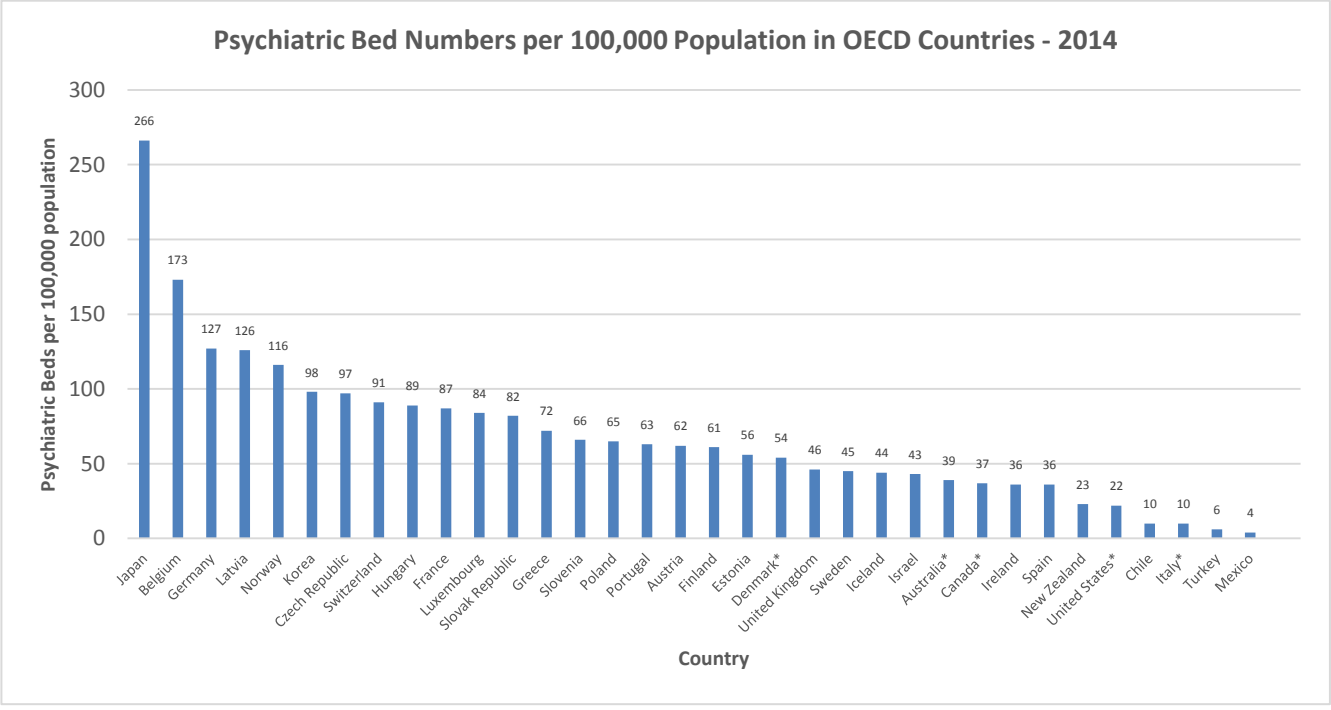
Introduction

The reported number of psychiatric beds per capita indicates a remarkable variation between different countries, with a range from 4 beds per 100,000 population in Mexico to 266 per 100,000 in Japan (OECD, 2017). Even limiting comparisons to European countries, the Organization for Economic Cooperation and Development (OECD) data, shown in Figure 1, indicate that Belgium has 173 psychiatric beds/100,000 while Italy has only 10/100,000 population. There is no prior reason to believe that the outcomes achieved by the Italian mental health services are worse than those in Belgium. Indeed, some scholars indicate that Italy has avoided some of the problems that have accompanied deinstitutionalization in other countries (Morzycka-Markowska et al., 2015). If a country can provide equivalent clinical outcomes while using less than 10% of the inpatient services of a second country, then presumably the second country can make significant savings by closing expensive inpatient services and funding community programs that are typically less expensive. Indeed, fiscal pressures in many western countries have resulted in what appears to be an inexorable decline in the number of psychiatric beds. Canada's beds have been declined from 40 beds per 100,000 in 2007 to 36 beds per 100,000 in 2013 (OECD 2017); the US has seen a reduction from 28 beds per 100,000 in 2003 to 21 beds per 100,000 in 2013 (OECD, 2017) and the UK a reduction from 78 beds per 100,000 in 2004 to 46 beds per 100,000in 2014 (OECD, 2017). Many clinicians argue that the reduction in the availability of inpatient psychiatric services has already resulted in a disastrous deterioration in psychiatric services and in the outcomes for people with severe mental illness (Sisti et al., 2015; Torrey, 1998). Admission to an acute psychiatric unit is often impossible even when deemed necessary and patients must be boarded, sometimes for more than a week, in emergency rooms until beds become available (Swartz, 2016, Bloom, 2015, Alakeson et al., 2010). Some countries have developed regionally integrated admission systems in which psychiatric beds in any hospital within that region are available to admit patients from any part of the region. While, ensuring that all psychiatric beds are used efficiently, integrated systems result in the transfer of patients to hospitals far from their family, friends and community services (Lancet Psychiatry, 2015). Even when patients are fortunate enough to be admitted to the few remaining beds, inpatient stays have been shortened to the point that they can only provide acute stabilization (Glick et al., 2011; Allison & Bastiampillai, 2015).

Comprehensive assessment of the multifactorial issues associated with severe mental illnesses is seldom possible (Glick et al., 2011; Tyrer et al., 2017) and as a result, treatment is increasingly restricted to pharmacological interventions. Discharge planning tends to be perfunctory and discharge to homeless shelters even seen as acceptable (Forchuk et al., 2006).

Figure 1. ***Psychiatric Bed Numbers per 100,000 Population in OECD Countries – 2014***



Do limited numbers of psychiatric beds and the resulting problems in the service system lead to adverse outcomes? It is difficult to provide a definitive answer to this question. Researchers have demonstrated associations between various adverse outcomes and declining numbers of psychiatric beds. These associations include increased suicide rates (Bastiampillai et al., 2016; Munk-Jorgensen, 1999), increased homelessness (Markowitz, 2006) and increased rates of incarceration (Mundt et al., 2015; Priebe et al., 2005). While, correlation does not prove causation, the reader should keep in mind the practical difficulties of undertaking a randomized controlled trial examining a major reduction in psychiatric bed numbers. This has never been attempted, and we are therefore left with evidence from observational studies that show strong correlations between bed reductions and poor outcomes. The possibility that mental health policy might be causing, homelessness, death and incarceration of our most vulnerable citizens cannot be dismissed lightly. This disturbing possibility leads us back to the question of how Italy appears to manage with less than a third of the beds available in Canada, where psychiatric services are strained, and with half the beds available in the US, where services are in notable turmoil (Bloom, 2010). One possibility is that there is an insufficient quantity, or the wrong type, of community services in these countries (CMHA, 2016). This explanation would suggest that Italy has either more community services, or innovative community services that have yet to be emulated by other countries. An alternative explanation, that has received less attention in the academic literature, is that the reported differences in international bed numbers are inflated or actually non-existent. In this study, we first examine data on the number of psychiatric beds in two Canadian provinces to determine the accuracy of these data in a country with a well-established health information system. We then examine the low bed numbers reported by Italy to determine if they can are comparable in their current form to numbers reported by Canada.

Method

We accessed international data from the OECD website (OECD, 2017). Canadian bed numbers were accessed from the Canadian Institute of Health Information (CIHI, 2017). We obtained additional administrative data from hospitals in Middlesex and Essex counties in Ontario and from the Ferrara region of Italy.

Table 1. ***Number of Psychiatric Beds quoted by CIHI versus by the Chiefs of Psychiatry in Nova Scotia***

Hospital Name	Psychiatric Beds from CIHI Data (2013-2014)	Psychiatric Beds from Chiefs of Psychiatry (2015)
Nova Scotia Hospital	124	110
East Coast Forensic Hospital	92	92
Cape Breton Healthcare Complex	64	46
Queen Elizabeth II Health Sciences Centre	47	47
IWK Health Centre	20	16
Aberdeen Hospital	20	8
St. Martha's Regional Hospital	19	10
Soldiers Memorial Hospital	18	0
Yarmouth Regional Hospital	16	10
Colchester Regional Hospital	10	12
Cumberland Regional Health Care Centre	10	0
Valley Regional Hospital	9	9
South Shore Regional Hospital	9	9
Fishermen's Memorial Hospital	6	0
TOTAL	464	369
Beds per 100,000 population	49.1	38.9

Canadian Study

Canada is a federal country consisting of 10 provinces and 3 territories. Health care is a responsibility of the individual provinces and territories. The Canadian Institute of Health Information collects data from the Ministry of Health in each jurisdiction and records this information on the CIHI web site (CIHI, 2017). To check the accuracy of CIHI data, we contacted the chief of psychiatry at each hospital by email in the provinces of New Brunswick and Nova Scotia and asked them to provide the number of psychiatric beds in their facility. We choose New Brunswick and Nova Scotia as they are smaller provinces and it was feasible to contact all hospitals with psychiatric beds in these two provinces. We contrasted the number of beds reported by the chiefs of psychiatry at each hospital and compared that number to the number of beds listed by CIHI. When there was a discrepancy in the two numbers, we asked the chief of psychiatry to confirm the number and when a discrepancy remained, to provide any information that would help us understand the reasons for the discrepancy. Contact with the chiefs of psychiatry in these provinces was facilitated by a senior psychiatrist in each of these provinces (see acknowledgements).

Canada – Italy Comparison

One of us (ROR) visited the northern Italian cities of Verona and Ferrara and toured the inpatient and some community psychiatric services in these cities to better understand how services were structured. Preliminary findings from these site visits are reported here.

Results

Canadian Study

The CIHI data indicate that Nova Scotia had 464 psychiatric beds in 2013; whereas, the number reported by the chiefs of psychiatry was 369: see Table 1. Nova Scotia had a population of 944,800 in 2013 and based on this population, CIHI data indicate that the province has 49.1 beds/100,000 population. In contrast, using the bed numbers provided by the chiefs of psychiatry indicates that the province has 38.9 beds/100,000. The additional 95 beds as reported by CIHI represent a 26% greater availability of psychiatric beds than that reported by the chiefs of psychiatry. Discussions with the chiefs of psychiatry revealed that the major source of discrepancy was CIHI labeling of "residential" services to treat addictions as psychiatric beds. The chiefs of psychiatry did not consider these psychiatric beds. These residential services for addiction are provided in non-hospital settings and not connected administratively with acute psychiatric services. A total of 62 beds in the CIHI database were used to provide residential services for individuals who were withdrawing from alcohol or other substances, or residential services providing counseling services for individuals with addictions. The CIHI data for New Brunswick shows a total number of psychiatric beds for the province of 389 for the year 2013-2014; whereas, the total number reported by the chiefs of psychiatry was 355. The CIHI data is reported after a time lag typically of one to two years. Discussions with the chiefs of psychiatry indicated that there had not been a significant reduction in psychiatric bed numbers at any site. Rather, the major discrepancy were simple inaccuracies in recording bed numbers, which nearly always had the effect of overestimating the number of available beds in the province's major hospital: see Table 2.

Canada- Italy Comparison

Deinstitutionalization in Italy was driven by legislation. Law 180, introduced in 1978, stipulated that no new psychiatric hospitals could be built (Burti & Benson, 1996) and that all free-standing psychiatric hospitals were to be phased out. In their place, psychiatric units were to be opened in general hospitals and legislation stipulated that these units could have no more than 15 beds (Burti & Benson, 1996).

Visits to the Italian cities of Verona and Ferrara were helpful in establishing that many individuals suffering from severe mental illnesses receive services in residential rehabilitation centres. These centres are free-standing units, which provide psychiatric treatment and rehabilitation and are staffed 24 hours per day by nurses. Psychiatrists and rehabilitation therapists work in the centres on a full-time basis. Patients typically reside in the centres for several months.

In Ferrara, the mean duration of stay in the three existing rehabilitation units ranged from 41 to 163 days (Grassi, 2016). Most patients in these units have psychotic disorders, but approximately one-quarter have a primary diagnosis of affective or personality disorder (Grassi, 2016).

Table 2. ***Number of Psychiatric Beds quoted by CIHI versus by the Chiefs of Psychiatry in New Brunswick***

Hospital Name	Psychiatric Beds from CIHI Data (2013-2014)	Psychiatric Beds from Chiefs of Psychiatry (2015)
Centre Hospitalier Restigouche	172	140
Centracare	50	50
The Moncton Hospital	27	25
Hôpital Régional Chaleur	27	27
Dr. Everett Chalmers Regional Hospital	25	25
Saint John Regional Hospital	23	23
Centre Hospitalier Universitaire Dr-Georges-L.-Dumont	22	20
Hôpital Régional de Campbellton	18	20
Hôpital Régional d'Edmundston	13	13
Miramichi Regional Hospital	12	12
TOTAL	389	355
Beds per 100,000 population	51.5	47.1

These data suggest that the patients served in Italian residential rehabilitation centres are similar to those served in tertiary mental health services in Canada. However, we also note that under the Italian law, only voluntary patients can be admitted to these units. This is in contrast to the situation in Canada where many patients are admitted to tertiary psychiatric units on an involuntary status. Whether this reflects a less ill group of patients in residential rehabilitation centres or a different standard for, or way of using the Mental Health Act is unclear.

If beds in residential treatment centres are added to the psychiatric beds in public hospitals, it markedly increases the total number of beds. For example, the province of Ferrara, which has a population of 354,073 (https://en.wikipedia.org/wiki/Province_of_Ferrara), has two psychiatric units which are located in general hospitals, St. Anna University Hospital and the Delta Hospital, both of which have 15 beds. Restricting the definition of a psychiatric bed to those in the two psychiatric results in a figure of 8.5 psychiatric beds per 100,000 for the Province of Ferrara. The province of Ferrara also has three residential treatment units, two of which have 15 beds and one with 35 beds. The addition of these beds brings the per capita figure in Ferrara to 26.8 psychiatric beds per 100,000.

Italy also has many private psychiatric hospitals that are not counted in the OECD numbers. There are 54 private psychiatric hospitals, which have slightly more beds than the public system (De Girolamo et al., 2007). By contrast, Canada has only one private psychiatric hospital, Homewood Health Centre in Ontario, which has 293 beds.

Finally, in Italy, elderly patients who have dementia and behavioural problems are generally not admitted to psychiatric units, but are treated by geriatricians in general hospital beds (Pycha et al., 2011; Lora, 2009). Similarly, children and adolescents, including those with developmental problems who also have behavioural problems, are typically not admitted to psychiatric beds. These types of patients are usually treated in pediatric units when inpatient care is needed (Pycha et al., 2011).

Discussion

Policy makers, administrators and clinicians must exercise considerable caution when interpreting data on inpatient services. Even data from a single country, such as Canada, requires careful scrutiny to allow accurate comparison across provinces. We found both simple errors in counting bed numbers in addition to systematic differences in the

way a psychiatric bed was defined. While we noted one instance in which the beds from a large psychiatric hospital were not included – which had the effect of underestimating the number of psychiatric beds – most cases of error and definition resulted in an inflated number of beds. Canada is a country that has well developed information systems.

Turning to international comparisons, we identified several factors that markedly reduced the number of beds reported in Italy compared to other international comparisons. The two major omissions were the exclusion of private psychiatric beds and the exclusion of rehabilitation facilities from the Italian data. Rehabilitation facilities in Italy provide bedded services that appear to be similar to those provided by many tertiary care hospitals in Canada and other western countries.

The closure of psychiatric hospitals in Italy has had a variety of effects. One has been to transfer the care of groups of patients with behavioural problems, such as the demented elderly and children to receive care by other specialists. Some of this care is provided in hospitals, but unlike the situation in Canada, the beds to which these patients are admitted are not counted as psychiatric beds.

The combination of these factors results in Italy reporting a figure of psychiatric beds that is deceptively low. If we include residential treatment beds and private psychiatric beds, Italy and Canada appear to have broadly similar numbers of psychiatric beds. However, there are a number of important caveats that limit certainty about this equivalence. We do not know the diagnostic profile or acuity of patients admitted to private psychiatric units in Italy and whether these patients would be admitted to the public system in Canada. Also, we were unable to estimate the number of non-psychiatric beds in Italy that are used for children and adolescents with behavioural problems and to treat behaviourally disturbed demented individuals who might be admitted to psychiatric units in other jurisdictions.

Conclusions

An important conclusion from this study is the need to be cautious when considering the official Italian bed numbers. One cannot conclude that the low numbers of psychiatric beds reported by Italy indicate that bed numbers in other countries can be reduced to match this official Italian figure without serious consequences for the psychiatric service system and ultimately for individuals with mental illness. The Italian numbers, as currently reported, are not comparable with those of other western countries. We believe that a comprehensive examination of these data should be a priority for policy makers in western countries.

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Invited Comment

Billion dollar implications from the O'Reilly et al. study

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Author's contributions: Both authors contributed to concept development. The lead author wrote the first draft, and all authors were responsible for revising the correspondence

Key words: *Mental health policy, psychiatric beds, measurement error*

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Comment

O'Reilly, Shum and Grassi's findings (this issue) have significant international implications. They are particularly valuable for policy makers in Australia. Both Canadian and Australian Governments fund relatively low numbers of psychiatric beds by international standards, and in both countries, psychiatric services are under great strain. While Canada ranks 27th among the 35 Organisation for Economic Cooperation and Development (OECD) countries for total hospital-based psychiatric beds for the population, Australia is nearby, placed 26th (Health Statistics, 2015: http://stats.oecd.org/#).

Mental Health policymakers in countries with low psychiatric bed numbers such as Canada and Australia have been inspired and consoled by the Italian model. Italy was a pioneer of the deinstitutionalisation of standalone mental hospitals, and is frequently cited as an exemplar of a high-income country with a well-functioning mental health system, requiring very low numbers of inpatient psychiatric beds. After the Basaglia Law was passed in 1978, Italy gradually closed the mental hospitals, and also placed a limit on the number of acute psychiatric beds in general hospitals (15-bed maximum). Within these legal constraints, the Organisation for Economic Cooperation and Development (OECD) reports that Italy has few officially recognised hospital-based psychiatric beds left (10 beds per 100,000 population according to the Italian Ministry of Health figures, compared to the OECD average of 71 beds per 100 000 population: OECD Health Statistics, 2015).

However, the OECD noted important issues with the Italian model including regional disparities in mental health care, and issues with data quality. In 2014, the OECD warned, "regional disparities in Italy's mental health services, for example the distribution of inpatient facilities, remain a concern". Furthermore, the OECD stated, "Up until now there have been important regional disparities in data collection meaning that a nation-wide picture of mental healthcare has been difficult to establish in Italy". These issues may affect the picture that foreign governments receive of the Italian model, and may cause problems when they attempt to transfer aspects of the presumed model to other countries.

Often, international policy makers have concentrated on Trieste, which is a small city (population: 200,000 people) with a unique culture, whose model of care is not easily transferrable to larger metropolitan-based mental health services in foreign countries. For example, Australian policy-makers were impressed by mental health care in Trieste (Parliament of Australia, 2006; South Australian Social Inclusion Board, 2007). After observing the Trieste model, a parliamentary report stated, "Early, easily accessible, community-based intervention is successful in reducing serious episodes of illness that require acute care and therefore cost (Parliament of Australia, 2006). Over

the next decade, Australian policy-makers concluded that acute psychiatric bed numbers could be safely reduced from 39 hospital-based psychiatric beds per 100,000 population, closer to the official Italian level of 10 beds per 100,000 population, provided the billion dollar savings were transferred to increased investment in community programs (Allison and Bastiampillai, 2015; Allison, Bastiampillai, Licinio, 2017).

The State of South Australia followed this policy by closing acute hospital psychiatric beds to fund an expansion of short-stay (14-21 day) community intermediate care beds. The aim was to develop a stepped model of care, based on the Trieste model (South Australian Social Inclusion Board, 2007). Over the transition period, the step-up/step-down functions of the community beds were expected to reduce the demand on the state's metropolitan acute hospitals, but instead emergency department (ED) waits increased progressively year-on-year, peaking at an average ED wait time of 33.5 hours for admission to an acute bed during 2014 (Allison and Bastiampillai, 2014). At this point, the State Government increased investment in hospital-based psychiatric beds, and decreased the reliance on community intermediate care beds to successfully avert the crisis in the state's EDs. Following these changes, the State of South Australia had 35 hospital-based psychiatric beds per 100,000 population (across the public and private sectors), and 7 community intermediate care beds per 100,000 population (Allison, Bastiampillai, Licinio, 2017).

What went wrong? Why didn't the model work as planned in South Australia? The study by O'Reilly, Shum and Grassi (2017) provides some answers. It appears that the official figures on the total numbers of hospital-based psychiatric bed numbers may significantly underestimate the full psychiatric inpatient capacity funded for patients in Italy. This may mislead other countries into reducing psychiatric bed numbers too low without adding the full range of features that make the model function effectively in Italy.

As a first step, O'Reilly, Shum and Grassi (2017) explored the sources of measurement error in the routine reports of psychiatric bed numbers in Canada. They found discrepancies between the national data from the Canadian Institute of Health Information (CIHI), and reports from the chiefs of psychiatry on the beds actually available for patients with mental health presentations in the provinces of Nova Scotia and New Brunswick. The national CIHI dataset indicated considerably higher numbers of psychiatric beds than those available in practice (49 versus 39 psychiatric beds per 100,000 population). The study found the difference was due to variations in the definition of psychiatric beds, and simple errors in the bed counts. These results bring into question the data that Canada reports to the OECD on the availability of psychiatric beds, which comes from the CIHI dataset giving inflated numbers for Nova Scotia and New Brunswick.

Secondly, O'Reilly, Shum and Grassi (2017) compared the availability of psychiatric beds in Canada and the Italian cities of Verona and Ferrara. The study found that the official Italian figures were deceptively low because the dataset did not include non-acute residential psychiatric beds, private psychiatric beds, and non-psychiatric medical beds (child and older adult beds) that were occupied by patients who would usually be treated in psychiatric beds in other countries. Most notably, Italian residential rehabilitation centres were not included in the OECD data while non-acute beds in Canadian tertiary mental health services were. Hence, policy-makers from foreign countries should treat the official figures with caution, and seek a deeper understanding of how the Italian model actually functions.

O'Reilly, Shum and Grassi are to be congratulated on undertaking this landmark study which has billion dollar implications for mental health policy in high-income countries. It is clear that governments should be careful in making decisions based on international comparisons using data with huge sources of measurement error (arising from inexact definitions of psychiatric bed types and inaccurate bed audits). Many more international studies are required to compare and contrast the structure and functioning of psychiatric inpatient systems around the world. These studies should form the basis for evidence-based policies on psychiatric inpatient care in high-income countries.

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Invited Comment

From Ireland a reflection on the article by Richard O'Reilly et al.:

Is continued bed reduction, albeit counterbalanced by the benefits of intensive community treatment in the best interests of patients?

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As in other countries psychiatric inpatient beds numbers in Ireland have decreased progressively and very significantly during the last 50 years, decreasing from 19,801 in 1963 to 2,408 in 2016 (Daly & Craig, 2016). Many of these in-patient beds were previously located in large psychiatric hospitals and many of the patients were long stay, often for years. Nearly all of the large psychiatric hospitals with long stay wards have now closed are in the process of closing or have only acute admission wards left functioning. *Although these reductions are to be welcomed, the question arises as to whether there is there a point where further bed reductions start to be harmful to patients?* The beds that remain are for acute, short term admissions in the great majority of cases. These admission beds or places are in general hospital psychiatric units, 32.93% of residents, psychiatric hospitals/continuing care units, 32.10%, and independent/private and private charitable centres, 25.83%. The remainder of residents, 9.14%, were in forensic services, intellectual disability services or in an intensive care and rehabilitation unit, according to the 2016 census of in-patients (Daly & Craig, 2016).

Guiding documents

The guiding document for the future development of Irish mental health services is A Vision for Change, the report of the expert group on mental health policy, published in 2006. (Government Publications Office, 2016.) This very influential document has provided a blueprint for service development for clinicians and managers. It emphasizes community treatment based on community mental health teams covering sectors of 50,000 and encourages home based treatment, the Recovery Model, crisis houses for crisis intervention together with recommendations for different specialties. It has generally been well accepted, apart perhaps for its recommendations on in-patient bed numbers, which have been contentious.

The Bed Number Benchmark

It recommends that there should be 50 in-patient beds for a population of 300,000, based in either one or two units located in general hospitals in the region. This equates to approximately 17 in-patient beds per 100,000 population, which is just over one half of the present compliment of public in-patient beds, approximately 33 beds per 100,000 population. The latter figure is derived from the "Irish Psychiatric Units and Hospital Census 2016" (Daly & Craig, 2016) which provides in-patient figures for public and private facilities at a point in time in 2016 (31st March). For public beds the figure was 1,566 patients. Given that the population of Ireland according to the 2016 population census (Government Publications Office, 2006) is 4.773 million and given that public beds are nearly always full, the figure 33 per 100,000 provides a good approximation of public bed numbers. This does not include private in-patient beds, which would increase the figure to approximately 47 per 100,000. However, private beds would also not be included in the Vision for Change recommendations. In addition to the above, Vision for Change states that there should be eight assessment beds for the Psychiatry of Old Age and five beds for patients with Intellectual Disability in these General Hospital units.

This document has been used by managers and senior clinicians to produce plans in each region to significantly cut general adult in-patient bed numbers, proposals which are often opposed by a significant number of psychiatrists.

No room to manoeuvre

There are a number of factors which make continuing reductions in inpatient places dangerous, past a certain point. Community teams and Home Based Treatment, although extremely effective, often cannot provide the amount of care and supervision required for patients experiencing suicidal thoughts or for those with severe psychoses. Once beds numbers fall beyond a certain point, psychiatrists find themselves having to opt for community treatment for patients with suicidal thinking and since it is extremely difficult to predict who will continue to completed suicide, this becomes a form of "Russian Roulette".

As Professor O'Reilly et al have commented there is an association between declining bed numbers and increased suicide rates, even though a cause and effect relationship has not been established. Also, with declining bed numbers, psychiatrists start having to discharge the "least unwell" in-patient in order to admit another patient. It is arguable whether this is the best way to treat severe mental illness and the community may not be the best place to treat severe psychosis. The problem is often compounded in practice by elderly or other patients with cognitive, social or behavioural problems who are awaiting suitable placement and often cannot be discharged for long periods of time, reducing the effective number of beds in a facility (patients who are pejoratively termed "bed blockers"). As acute bed numbers are further reduced the above problems come increasingly to the fore and there comes a point where it has to be determined if continued bed reduction is in the best interests of patients, albeit this being counterbalanced by the benefits of intensive treatment in the community.

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Invited Comment

Comparing psychiatric bed numbers across jurisdictions: the UK version

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Despite variations in identifying and classification of psychiatric beds there has been a steady and accelerating closure of psychiatric beds, particularly the acute psychiatric beds in the United kingdom (OECD, 2017). Comparing psychiatric bed numbers amongst various jurisdictions is not a straightforward task, even though on the whole there is less variation within the countries of the UK compared to the provinces and territories in Canada. There is lack of clarity regarding what is considered to be a psychiatric bed and how it is defined. Does it include persons receiving treatment in rehabilitation facilities, group homes or addiction recovery settings? In any event there have been cuts across all categories of psychiatric beds for mentally ill patients in the UK. However the cuts and closures of the acute psychiatric beds are the most crucial and have been having an impact on the provision of services across the entire spectrum of available resources for providing care for these patients.

The Organisation for Economic Cooperation and Development (OECD) is an intergovernmental economic organization with 35 member countries, founded in 1960 to stimulate economic progress and world trade. It provides a platform to compare policy experiences, seek answers to common problems, identify good practices and coordinate domestic and international policies of its members. The main OECD Health database includes more than 1200 indicators covering all aspects of health systems for the 35 OECD member countries. To determine how well the OECD country is doing, it assesses five dimensions: 1) Health Status; 2) Risk Factors to Health; 3) Access to Care; 4) Quality of Care and 5) Health Care Resources. The indicators are based on three main criteria: 1) policy relevance; 2) data availability and 3) data interpretability (OECD, 2017). It has been publishing the number of psychiatric beds in the UK. The number of what is defined as psychiatric beds has reduced significantly and continuously. For example the number of psychiatric beds reduced from 78 beds per 100,000 in 2004 to 46 beds per 100,000 in 2014 (OECD, 2017).

Cost is a significant factor that drives the closure of acute psychiatric beds in the UK. Inpatient care is expensive as the average cost of an acute inpatient stay in the UK is £11,500 per patient (Commission in Adult Acute Psychiatric Care 2016). The other factor is that formal Government inquiries fail to recommend an increase in bed numbers. This is because the existing beds in acute psychiatric units are often very unpleasant settings and do not provide a therapeutic environment either because they are housed in unsuitable buildings or because of inadequate staffing levels.

As a result of the decrease in number of available beds, the admission threshold for inpatient psychiatric beds has changed considerably. For example, admitting patients who have anxiety and affective disorders has almost stopped unless they present an immediate risk or are have reported to have significant risk factors. The average length of stay for patients with affective disorders has also reduced (Bastiampillai et al., 2016). The proportion of patients who are admitted involuntarily under the provisions of the Mental Health Act to patients who are admitted voluntarily as inpatients has increased.

The average length of stay is 15 days in the UK (Thompson et al., 2004). However due to the pressure of a shortage of beds, this may have become longer at times as many hospitalized patients in the acute psychiatric units are involuntary patients. The gate keepers for the acute are units are Home Treatment Teams which are also called Crisis Resolution Teams. These teams are accustomed to

try everything to keep patients in the community and even offer them temporary places like bed and breakfast accommodations if they are homeless. They make every effort to keep patients out of hospital. When an admission finally becomes inevitable the teams spend a large proportion of their time with the acute psychiatric bed managers to find a bed. At times they may decide to delay the admission or to discharge patients prematurely to create a bed. Sometimes the acute psychiatric units have more than 100% occupancy because patients may be taken to the general medical wards for non-psychiatric treatments or are on trial home leaves. It is not uncommon that when these patients need to come back to their wards they find their beds have been occupied by other patients. Often delayed admissions or postponed voluntary admissions eventually end up as longer involuntary admissions (Jacobs et al., 2015). So data from the Organisation for Economic Co-operation and Development (OECD) for the UK which indicate lower admission rates, include patients either receiving treatment in primary care, not receiving treatment or being cared for by crisis resolution teams.

It is important to recognise that in the UK compared to Canada there is a robust and consistent primary care provision for the entire population including mentally ill patients. There is also a strong independent community mental health team establishment that is systematic and neither program based nor extensions of hospital psychiatric teams. However in the UK, commissioning of mental health services is fragmented between Clinical Commissioning Groups (CCGs) and local authorities and the National Health Services (NHS). As a result, the quality of local mental health services can be varied including provision and availability of acute psychiatric beds. Implementation of the The National Institute for Health and Care Excellence (NICE) guidelines in the UK for mental illnesses has been a positive factor for delivering consistent, effective and evidence based interventions which have led to better care and a reduction in relapse rates.

The establishment of Home treatment/ Crisis Resolution teams and other adjustments such as implementation of Improving Access to Psychological Therapies (IAPT) in every Borough are welcome improvements. Yet that does not justify the rate and the speed of closure of psychiatric hospital beds. These are a significant component of Mental Health Services enabling urgent care, treatment and support for a range of conditions affecting people's psychological wellbeing (Tyrer et al., 2017).

While most people with serious mental illnesses live peacefully in the community most of the time (Slade, 2010), it is necessary to have adequate acute inpatient psychiatric beds when they do not. In the UK bed reduction has been taking place at an accelerated rate. The Five Year Forward View was produced by NHS England in October 2014 as a planning document for health care provision including mental health in England. It states there will be extra investment in adult social care which would be used in part to reduce delays of transfers to community care, thereby helping to free up acute hospital beds (NHS England, 2017).

Except for opening some beds for mental health in Mother and Baby Units, there is no plan to reopen any acute psychiatric beds. The unprecedented reduction in psychiatric beds has resulted in putting huge pressure on the provision of mental health care in the UK. It remains to be seen whether extra investment in adult social care frees up psychiatric beds or if it just covers the deficit in adult social care.

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Invited Comment

"We as scientists have a responsibility to report clearly what the numbers say and do not say" - A reflection on the article by Richard O'Reilly et al.-

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Professor O'Reilly and colleagues have shown that comparing health care systems across countries is not as straight forward as it seems. Regarding the number of psychiatric beds per country, they found not only discrepancies between the numbers reported by hospitals themselves and the numbers of the Organization for Economic Cooperation and Development (OECD), but, more fundamentally, they noted between country differences in definition of "a psychiatric bed". It appears that the relative low number of psychiatric beds in Italy can partly be explained by the number of uncounted private beds, or the number of patients in residences. This difference in definition of registration is well known, but often forgotten in the public or policy domain.

For example, in the latest report of the World Health Organization (WHO) on suicide prevention, right after it is reported that around 804,000 suicides occur globally, the authors state that this number is likely to be flawed (WHO, 2014)! As suicide is still illegal in many countries, the number of actual suicides is probably underreported. Also, even in countries with good vital registrations, suicides get registered as an accident or death with unknown cause, heavily deflating the number of suicides. After more close reading the report, one finds that only 60 of the 172 WHO member countries had good-quality vital registration systems, and the rates for the other 112 countries that account for around 71% of the global suicides, had to be estimated using modeling techniques. Still, in media outlets or policy reports, the presented numbers are often used to present the level of suicide prevention within a country, without any notion of possible limitations.

The topic of bed reduction is of even more vital importance for the Netherlands. According to the OECD data, we have 139 psychiatric beds per 100.000 people, well above the OECD average of 68 and way above the number of 36 in Canada. Even though these numbers are unlikely to be accurate, they at least indicate that when compared to other countries we do rely heavily on hospital mental health care. Even without comparing the number of psychiatric beds with other countries, a fact remains that in the Netherlands, half of the mental health care budget goes to only 5% of the psychiatric patients. Given the high demand of mental health care in the Dutch population, we do not need an OECD report to see that we have to re-think the way we organize care for psychiatric patients in the Netherlands. Different authors have argued that Italy was able to change its mental health policy in the 80s, because the overall quality of mental health care was at a low level anyway. As Dutch mental health care has always had a relative good level of quality, there was, and still is, no real incentive for mental health institutions to innovate. As costs keep on rising, and mental health has difficulty to innovate itself, the government is intervening via budget cuts. This even further limited the will of the sector to innovate, as they experienced the budget cuts as unwanted, and lost the perspective of the health benefits of bed reductions.

At the Netherlands Institute for Health Services Research (NIVEL), we monitor health care uptake within primary care for about 10% of the Dutch population. Our data is used each year to inform policy makers about change in health care uptake. For example, our data has been used to monitor a large transition in Dutch mental health care, where a stronger focus on primary care was introduced. We write reports on how many people visit the general practitioner for a depression or visit a mental health nurse within the primary setting. However, what most people do

not realize is that we do not count how many people actually visited the general practitioner for depression. We report for how many people a doctor *registered* a depression. We know that doctors tend to underdiagnose depression. We also know that there is quite a large inter-doctor variability for registration of health care problems. For example, a patient that comes in with feeling blue can get a registration code of a depressive disorder, depressive feelings, stress or burn-out. So, although we report that for example 5% of the patients visit a doctor for depressive feelings or depression, due to the fact that we have sampled only 10% of the Dutch population, this number should actually be given with a margin of error. Also, the public should constantly be made aware of the fact that we report registration, not actual complaints.

We as scientists have a responsibility to report clearly on what we actually measure. Even when we do, you will find numbers are often misinterpreted or misused for policy purposes. Our task as scientists is to constantly improve our measurements while explaining what the numbers say and what they do not say. Does this mean that reports of our institute or the OECD have no role in health care policy? My stand would be that, as long as we communicate that the numbers present an estimate of the actual numbers, and as long as we keep on improving our estimates, registration data provides crucial information for policy makers. The article of Professor O'Reilly and colleagues helps to make us aware of the current flaws and offers changes to improve registration and better fully understand the data at hand.

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Invited Comment

Compromised Measures and Real World Applicability

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O'Reilly, Shum & Grassi (this issue) have done a great service in vividly illustrating some of the complexities and pitfalls in examining and comparing data on psychiatric bed availability. This is no mere academic exercise and their findings deserve wide distribution. As the authors indicate such data can be used to justify policy decisions with major implications for the health care system and people's lives. Their appeal for great caution in the use of such data appears fully justified.

I was fortunate in graduate school in being able to take a course on measurement taught by Clyde Coombs, whom some consider to have been the father of mathematical psychology. Coombs developed several important and rigorous measurement models with application not only to psychometrics but to politics and economics (some of which have been supplanted by more recent computing technology). Coombs kept coming to mind when reading this article for the following reason. On a regular basis he would present to the class a graph schematically representing the trade-off between methodological rigour and "real world significance". He was drawing attention to the fact that real world decisions are often made on the basis of very compromised measures and that refined measures often require highly controlled circumstances and, therefore, have limited generalizability. The ideal, as he often noted, was to recognize the limitations of measures and use the best ***possible*** data to inform policy.

Too often, in the real world (and perhaps also in the laboratory) the rules of evidence that researchers use are those of advocates in a courtroom predicated on presenting the strongest case for a particular position, rather than a dispassionate examination of the evidence. Health care is certainly one of the domains in which this can occur. My colleagues who are on the front lines of delivering care to those showing acute psychiatric symptoms see, often on a daily basis, the fallout from the limited availability of inpatient beds and concern about these phenomena have been gaining in public profile in recent times.

Other colleagues who attempt to provide community based care have legitimate concerns about what they sometimes perceive to be a disproportionate amount of resources going to hospitals while important community supports and programs struggle with limited funding. Each "side" lives with the implications of many policy decisions, such as the deinstitutionalization movement of the latter part of the past century. In the middle are the policy makers who are understandably susceptible to pressures resulting from the latest headlines, but who are also trying to make the best decisions in addressing such issues as the central one identified by the current authors "Do limited numbers of psychiatric beds and the resulting problems in the service system lead to adverse outcomes?"

Honest efforts to use empirical data to make the wisest decisions about such issues is surely preferable to totally ignoring available evidence, but as this paper clearly illustrates, a critical examination of the reliability and validity of the data is essential. As the authors note, even with the best of data, longitudinal and cross sectional comparisons require cautious interpretation, but they can be informative. When the data themselves are not comparable or valid, such comparisons are nonsensical and potentially dangerous.