

1 **The relationship between deinstitutionalization and quality of care in longer term**
2 **psychiatric and social care facilities in Europe: A cross-sectional study**

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1 **Abstract**

2 Background

3 The process of deinstitutionalization (community based care) has been shown to be
4 associated with better quality of life for those with longer term mental health problems
5 compared to long stay hospitals. This project aimed to investigate the relationship between
6 national progress towards deinstitutionalization and 1) quality of longer term mental health
7 care 2) service users' ratings of that care in nine European countries.

8 Methods

9 Quality of care was assessed in 193 longer term hospital- and community-based facilities in
10 Bulgaria, Germany, Greece, Italy, the Netherlands, Poland, Portugal, Spain and the UK. Data
11 on users' ratings of care were collected from 1,579 users of these services. Country-level
12 variables were compiled from publicly available data. Multilevel models were fit to assess
13 associations with quality of care and service user experiences of care.

14 Results

15 Significant positive associations were found between deinstitutionalization and 1) five of
16 seven quality of care domains; and 2) service user autonomy. A 10% increase in expenditure
17 was associated with projected clinically important improvements in quality of care.

18 Conclusions

19 Greater deinstitutionalization of mental health mental health services is associated with
20 higher quality of care and better service user autonomy.

21

22 **Keywords**

23

24 Psychiatry in Europe; Quality of care; Social and cross-cultural psychiatry

1. Introduction

Deinstitutionalization is the movement of the locus of mental health care from hospitals to the community. It includes not only closing down mental hospitals but ensuring the availability of mental health services within the community to address service user needs through policy, legislation and human and financial resources. Evidence from the literature suggests that although mental health service users in receipt of community-based care show no significant difference in symptoms compared to those cared for in hospital [1], they are more likely to have better social relationships, higher quality of life [2], fewer needs [3] and better overall functioning [4] than those in hospital.

Although deinstitutionalization is a goal of many mental health policies, the majority of the world's psychiatric beds are still located in mental hospitals or other institutional settings [5, 6]. Critiques of deinstitutionalization include high numbers of individuals with mental health problems who are homeless or incarcerated, cycle of discharge and readmission (the "revolving door") and instances of service user abuse and neglect in community-based settings [7].

Much of the evidence used to support or oppose deinstitutionalization have largely focused on comparisons of hospital and community facilities or the outcomes of service users relocated to the community following the closure of a large mental hospital. Large-scale, country-level evaluations of the impact of deinstitutionalization are necessary to determine whether this type of service configuration results in positive outcomes for service users. The

DEMOBinc: Development of a European Measure of Best Practice for People with Long Term Mental Illness in Institutional Care

QuIRC: Quality Indicator for Rehabilitative Care

MENDit: Mental Health Service Deinstitutionalization Measure

WHO: World Health Organization

DISC: Discrimination and Stigma Scale

FTE: full-time equivalent

AICc: correct Akaike Information Criterion

1 aim of this study was to evaluate the relationship between the deinstitutionalization of mental
2 health care at the country level and: (1) the quality of care provided in longer term psychiatric
3 and social care facilities; (2) service user ratings of this care.

4 **2. Methods**

5 2.1. Participants and procedures

6 Hospital and community-based residential facilities for people with longer term mental health
7 were recruited in ten European countries (Bulgaria, Czech Republic, Germany, Greece, Italy,
8 the Netherlands, Poland, Portugal, Spain and the UK) participating in the development of a
9 European measure of best practice for people with longer term mental illness in institutional
10 care (DEMoBinc) project [8]. Facilities providing care exclusively to specific sub-groups of
11 service users (e.g. older people, individuals with learning disabilities, forensic patients) were
12 excluded. Facility managers participated in a face-to-face interview with a DEMoBinc
13 researcher. Between five and 13 service users were randomly selected from each facility to
14 complete a face-to-face research interview. Prior to participation, facility managers and
15 service users provided written informed consent. Service users were excluded only if they
16 were not present at the time of recruitment, lacked mental capacity to provide informed
17 consent or were unable to complete the interview. A detailed description of the sampling
18 process is provided by Killaspy and colleagues [8]. The DEMoBinc project was approved by
19 the relevant ethics committee in each country.

20 2.2. Variables

21 Quality of care was assessed using the Quality Indicator for Rehabilitative Care [QuIRC; 9].
22 Quality scores for each of the seven domains assessed (Living Environment; Therapeutic

1 Environment; Treatments and Interventions; Self-management and Autonomy; Social
2 Interface; Human Rights; Recovery-based Practice) are presented as a percentage derived
3 from the ratings from facility managers' responses to 88 items. Higher percentage scores
4 indicate better quality of care in the relevant domain.

5 Service users' experiences of care were measured using standardised instruments of quality
6 of life [Manchester Short Assessment of Quality of Life; 10], autonomy [Resident Choice
7 Scale; 11], experiences of care [Your Treatment and Care; 12], and the therapeutic milieu of
8 the facility [Good Milieu Index; 13]. For all measures, higher scores indicated a more
9 positive experience of care. Demographic information including age, gender, diagnosis and
10 date of admission, was also sought from the service user and corroborated from case notes.

11 The degree of deinstitutionalization in each country was determined using the Mental Health
12 Services Deinstitutionalization Measure [MENDit; 14]. The MENDit consists of five items
13 which assess the closure of mental hospitals, availability of mental health care in primary
14 care settings, availability of community residential care, presence of a national mental health
15 budget and numbers of mental health professionals. Each item has a maximum score of one
16 and the sum of scores for all items provides the country's MENDit score (range: 0-5); higher
17 scores indicate greater progress towards deinstitutionalization. The tool was developed to be
18 completed using publicly available data. Scores for all countries were based on country
19 reports published within the WHO Mental Health Atlas 2005, a regular report of existing
20 mental health care legislation, policy and provision within United Nation member states [15].
21 Details of the development and items of the MENDit have been previously published by the
22 authors [14].

1 Potential confounding variables (based on the findings of studies conducted in similar user
2 groups and treatment settings) at both facility and country level were also measured.

3 1. Facility-level variables were restricted to those collected as part of the DEMoBinc
4 project. They included facility type (hospital or community residential mental health
5 facilities), full-time equivalent (FTE) staff to service user ratio (above or below the
6 sample mean) and whether the facility had an expected maximum length of stay (yes
7 or no).

8 2. Country-level variables were limited to publicly available data:

9 a. We used country level data on stigma associated with schizophrenia from a
10 pan-European study by Thornicroft et al. [16]. The Discrimination and Stigma
11 Scale (DISC) is a 36-item scale scored from 0-32 where increasing scores
12 indicate greater stigma related to schizophrenia.

13 b. The number of years to 2011 (the year the analysis was conducted) since the
14 introduction of mental health policy was obtained by country reports published
15 in the WHO Mental Health Atlas 2005.

16 2.3. Statistical analysis

17 Multilevel models were used as they allow for effects attributed to data clustering at the
18 facility and country levels to be taken into consideration when examining the variation
19 between outcomes (Luke 2004).

20 In order to examine the association between deinstitutionalization and the quality of care,
21 four two-level models were developed.

- 1 1. Model A: QuIRC domain scores (living environment; therapeutic environment;
2 treatments and interventions, self-management & autonomy; social interface; human
3 rights; recovery-based practice) were included separately as dependent variables at the
4 facility level (level 1). Progress towards deinstitutionalization was included as an
5 independent, country-level (level 2) variable.
- 6 2. Model B: The independent variables facility type, FTE staff to service user ratio and
7 having an expected maximum length of stay were added to the model as level 1 fixed
8 effects.
- 9 3. Model C: The degree of national stigma and the number of years since the
10 introduction of mental health policies were added as fixed effect, independent
11 variables to level 2 in Model A.
- 12 4. Model D: Both facility and country independent variables were added to Model A as
13 fixed effects.

14 Four, three-level models were developed to examine the association between
15 deinstitutionalization and service user ratings of care.

- 16 1. Model E: The service user ratings of quality of life, autonomy, experiences of care
17 and therapeutic milieu were included as dependent variables at the service user
18 level (level 1). Deinstitutionalization score was included as a fixed effect at the
19 country level (level 3).
- 20 2. Model F: The independent variables facility type, FTE staff to service user ratio
21 and having an expected maximum length of stay were added to the model as
22 facility level (level 2) fixed effects.

- 1 3. Model G: The degree of national stigma associated with schizophrenia and years
2 since development of mental health policy were added to Model E as level 3 fixed
3 effect, independent variables.
- 4 4. Model H: Both facility and country variables were added to Model F as fixed
5 effects.

6 Models of best fit were selected using the correct Akaike Information Criterion (AICc). [17]
7 An AICc value was calculated for each of the four models developed per dependent variable
8 and the model with the lowest AICc value was deemed as having the best fit. All models
9 were then checked to ensure assumptions of normality and homoscedasticity were not
10 violated. Data were analysed using STATA release 11.

11 **3. Results**

12 Two hundred and thirteen managers of psychiatric and social care facilities and 1,750 service
13 users were interviewed as part of the DEMoBinc project (see Figure 1). However, Czech data
14 were excluded from all analyses as national levels of stigma were not available. Therefore,
15 data from the remaining 193 facilities and 1,579 service users were included in the analyses.

16 The majority of facilities were community-based (71.0%) and located in an urban area
17 (51.0%). The mean number of beds per facility was 25 (SD = 20) with a mean of 23 (SD =
18 20) beds occupied at the time of recruitment. However, the number of beds varied
19 substantially by country. In Bulgaria six facilities had more than 80 beds with the largest
20 containing 120 beds.

21 The majority of service users interviewed were male (n = 999, 63.3%) and lived in
22 community facilities (n = 1064, 67.4%). The mean age of participants was 46 years (SD =

1 12.6) while the mean duration of their current **inpatient** admission was 4.5 years (range = 0.1-
2 50.1). Most participants had a diagnosis of schizophrenia or other psychosis (n = 1173,
3 74.3%) and described themselves as retired or unemployed (n = 1298, 82.2%). The mean
4 stigma score for all countries was 4.9 (SD = 0.8). The highest level of stigma associated with
5 mental health problems was reported in Portugal (5.9) while the lowest degree of stigma was
6 found in Spain (3.4). Mental health policies were first introduced, on average, 19 years before
7 2011 (SD = 9). Mean deinstitutionalization and quality of care scores, and service user
8 ratings of care for each country are presented in Table 1.

9 Associations between deinstitutionalization and quality and service user ratings of care

10 Increased deinstitutionalization of mental health service provision was significantly
11 associated with higher QuIRC domain scores for Living Environment (coef = 6.14, 95% CI =
12 4.31, 7.97), Therapeutic Environment (coef = 3.58, 95% CI = 2.01, 5.15), Treatments and
13 Interventions (coef = 3.36, 95% CI = 1.48, 5.25), Self-management and Autonomy (coef =
14 7.41, 95% CI = 2.16, 12.66) and Recovery-based Practice (coef = 4.88, 95% CI = 0.86, 8.90)
15 in models of best fit (see Table 2). A one point increase in deinstitutionalization score was
16 associated with an increase of 3.36 to 7.41 percentage points in QuIRC domain scores. A
17 significant positive relationship was also found between national levels of
18 deinstitutionalization and service user autonomy (coef = 7.11, 95% CI = 2.61, 11.61) in
19 models of best fit (see Table 3). Associations between deinstitutionalization and the QuIRC
20 Social Interface and Human Rights domains and service user ratings of quality of life,
21 experiences of care and therapeutic milieu did not reach statistical significance. All models
22 were homoscedastic and exhibited normality.

23 Clinical modelling

1 In order to understand better the clinical implications of increasing deinstitutionalization of
2 mental health care, projected changes in QuIRC domain scores and service user ratings of
3 care were calculated for MENDit scores equalling 3.25 (the sample mean) and 4.67 (the
4 highest score among the nine countries). Improvement was defined as an increase that raised
5 a country above the mean QuIRC domain score or service user rating for the sample. Prior to
6 projections, four countries (Poland, Spain, Bulgaria and Greece) had MENDit scores below
7 the sample mean with up to two countries scoring above the sample mean for any particular
8 QuIRC domain (see Table 4). When QuIRC domain scores were re-calculated based on a
9 hypothetical increase in MENDit scores to the sample mean, they improved by between 50
10 and 300%. All projected QuIRC domain scores, except Social Interface, rose above the mean
11 for all countries when MENDit scores were adjusted to 4.67. This included the Human Rights
12 domain which was not significantly associated with deinstitutionalization in the regression. In
13 similar fashion, increased deinstitutionalization was associated with increases in projected
14 service user ratings of quality of life, autonomy and satisfaction with care but not therapeutic
15 milieu.

16 For the five countries with MENDit scores above the sample mean, the predicted impact of
17 further increasing deinstitutionalization levels was mixed. The Self-management and
18 Autonomy QuIRC domain score saw the greatest improvement with predicted scores for all
19 five countries rising above the sample mean. However, for four of the other six QuIRC
20 domains, no improvement was predicted. A similar result was found for service user ratings
21 of care. Only quality of life ratings were predicted to improve with increased
22 deinstitutionalization.

23 **4. Discussion**

1 Our work is the first to investigate the relationships between national deinstitutionalization
2 and the quality of longer term psychiatric and social care facilities and service user ratings of
3 care. Specifically, we investigated the association between the degree to which a country had
4 deinstitutionalized its mental health care and a) the quality of care provided in its longer term
5 hospital and community based facilities and b) service user outcomes. Our results expand
6 upon previous facility-level findings that greater deinstitutionalization is associated with
7 higher quality of care in longer term psychiatric and social care facilities [1-4]. Specifically,
8 we found that greater deinstitutionalization was associated with higher ratings for five of the
9 seven domains of care assessed (promotion of self-management and autonomy, incorporation
10 of recovery-based practice, availability of treatments and interventions and better built and
11 therapeutic environments) in longer term facilities at the country level. Social interface and
12 human rights were not statistically associated with deinstitutionalization in regression
13 analyses. However, increased deinstitutionalization was associated with predicted clinical
14 improvements in upholding service users' human rights. Deinstitutionalization was also
15 positively associated with service user ratings of autonomy. However, ratings of quality of
16 life, experiences of care and therapeutic milieu were not significantly associated with national
17 levels of deinstitutionalization.

18 As deinstitutionalization gathers pace, mental health services diversify and fewer hospital
19 beds and more types of supported accommodation are provided (e.g. residential care homes,
20 staffed supported tenancies and 'floating outreach' support provided to people living in
21 independent tenancies) [18]. This raises the expectation that service users will continue to
22 recover and develop skills for more independent community living. Thus, it follows that
23 countries that are further along in the development of community based mental health care
24 may be more focussed in supporting service users towards this goal, resulting in greater
25 availability of treatments and interventions and promotion of autonomy and recovery-based

1 practice. In countries where deinstitutionalization is more established, such as the UK,
2 psychiatric reform has expanded to include greater service user engagement in treatment
3 decisions and ways to improve community integration [19, 20]. Our findings show that
4 increased focus on the provision of mental health care in the community for countries,
5 regardless of their current level of deinstitutionalization, is associated with an overall
6 improvement in the treatment and outcomes of individuals with longer term mental health
7 problems.

8 The QuIRC social interface domain assesses the facility's links with service users' families
9 and the wider community. Paradoxically, community rather than hospital-based facilities
10 were associated with *lower* social interface domain scores. This finding contradicts other
11 evidence [1] and, worryingly, suggests that facilities based in the community can become
12 isolated from their local communities. Given the recent UK scandal of abuses of care
13 reported in one stand alone, community based unit for people with mental health problems
14 and learning disabilities [21], senior clinicians and managers must not assume that
15 community based units will automatically lead to community integration. In fact, they may be
16 more vulnerable to stigma which has been suggested to act as a barrier to participation in
17 community activities [16]. Despite this finding, in our multilevel model, facilities with an
18 expected maximum length of stay had an almost 10 percentage point advantage in this
19 domain. An expected maximum length of stay presumes that service users may move beyond
20 the current facility, a concept encompassed in the "whole system approach", which highlights
21 the interplay between families, communities and health and social care services which are
22 necessary to the recovery process, that is encouraged in mental health rehabilitation services
23 [22]. When service users are expected to move on within a defined timeframe, they and their
24 staff can be clear about the goals of treatment and support. These are likely to include a focus
25 on building links with family and the wider community.

1 Our study found no significant relationship between deinstitutionalization and service user
2 rated quality of life. It may be that other variables such as social networks [23] and
3 employment [24], linked to deinstitutionalization but not measured in our study, are more
4 important to quality of life for this group. Previous studies have found an improvement in
5 quality of life among service users living in the community [25-29]. As this study was cross-
6 sectional, we were unable to evaluate change in quality of life.

7 Although increased deinstitutionalization was associated with greater quality of care and
8 more positive service user ratings of care, countries with less deinstitutionalization of care
9 still scored highly on some domains. These anomalies may be a reflection of cultural
10 differences between the countries included in the sample. Countries with stronger familial
11 ties, like Spain, had higher Social Interface QuIRC domain scores. In Greece, higher QuIRC
12 domain ratings and service user ratings of care may also be a result of improved enforcement
13 of care standards implemented following national attention to abuses in its mental health care
14 system in the late 1980s [30]. These inconsistencies suggest that we were unable to include
15 all the factors that determine the success of mental health care. Furthermore, countries
16 deemed ‘more advanced’ may have lessons to learn from countries with less
17 deinstitutionalized services as we work toward international provision of high quality mental
18 health care and improved service user outcomes.

19 4.1. Strengths and limitations

20 We were able to use the most comprehensive information available internationally on quality
21 of longer term mental health care facilities. The variables investigated were measured using
22 objective, standardised measures which allowed for appropriate cross-country comparisons.

1 Despite the strengths of this work, there are several limitations which must be considered.
2 The countries and facilities that participated were purposively recruited for the DEMoBinc
3 project, limiting the generalisability of results. However, as each country was chosen to
4 reflect European variations in national wealth and systems of mental health care provision,
5 these results are likely to be relevant to other European countries.

6 Exclusion of Czech facilities due to the lack of data on stigma meant that the total number of
7 facilities included in our analyses fell below the required number of facilities to reach 90%
8 power. However, our sample is larger than that required for 80% power using the same
9 parameters (N=168). Czech data (9.4% of the sampling frame) were excluded as we felt it
10 important to explore stigma associated with mental health problems as a potential
11 confounding variable. **The stigma of mental illness might influence a country's enthusiasm**
12 **for deinstitutionalization, quality of care and service users' perceptions of their care.**

13 The data were cross-sectional. As a result, models of best fit were able to investigate
14 associations between variables but could not provide evidence of causal relationships. The
15 relationship between service provision and quality is complex and likely to be subject to a
16 variety of influences. Furthermore, our research was constrained to facility and service user
17 variables collected as part of the DEMoBinc project, as well as country variables reported in
18 the literature, and could not evaluate the impact of deinstitutionalization on service users'
19 longer term clinical outcomes. However, recent work by Killaspy and colleagues suggests
20 that higher QuIRC domain scores are associated with improved service user outcomes [9].
21 These findings corroborate previous evidence from a longitudinal study on the closure of a
22 large mental hospital in London [1] and studies comparing hospital and community-based
23 longer term care [2-4] which found service users in receipt of longer term care in community-
24 based facilities had better functioning than those in long stay hospital settings.

1 4.2. Conclusions

2 The findings of this study suggest that less institutionalised mental health care is associated
3 with greater quality and service user ratings of care in longer term psychiatric and social care
4 facilities **in Europe**. The implementation of deinstitutionalization and scaling up of
5 community-based services is not a simple task and requires political will as well as the
6 strategic alignment of financial resources, mental health policies and legislation, and mental
7 health professionals. Although more work is needed to further understand the impact of
8 deinstitutionalization on quality of care and service user outcomes, our findings support
9 WHO recommendations for increased deinstitutionalization of mental health services. They
10 add weight to existing evidence that service users with severe and enduring mental health
11 problems can be successfully cared for in the community.

12 **Vitae**

13 Tatiana Taylor Salisbury

14 Tatiana Taylor Salisbury holds a joint lectureship in Global Mental Health at the Institute of
15 Psychiatry, Psychology and Neuroscience, King's College London and the London School of
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18 Measure of Best Practice for People with Long Term Mental Illness in Institutional Care
19 (DEMoBinc) project. She is currently co-investigator on the CHAKA (Mental health among
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21 Helen Killaspy

1 Helen Killaspy is Professor of Rehabilitation Psychiatry based in the Division of Psychiatry
2 in the Faculty of Brain Sciences at UCL. Her research focuses on services and interventions
3 for people with complex mental health problems. From 2007 to 2010, she led a three year
4 multicentre study funded by the European Commission (DEMoBinc) through which the
5 Quality Indicator for Rehabilitative Care (QuIRC) was developed. She is currently
6 Chief Investigator of the Quality and Effectiveness of Supported Tenancies (QuEST) project.
7 The programme is investigating the quality and outcomes associated with specialist supported
8 accommodation for people with mental health problems across England.

9 Michael King

10 Michael King is Professor of Primary Care Psychiatry based in the Division of Psychiatry in
11 the Faculty of Brain Sciences at UCL. He is a psychiatric epidemiologist who has a particular
12 interest in the design and conduct of randomised trials of complex mental health interventions
13 in primary and secondary care. He also undertakes observational research which includes
14 national surveys of mental health in the UK, and cohort studies in European populations to
15 understand the risks for mental disorders. He uses analysis of large national clinical data
16 bases to explore prevalence of psychiatric disorders, risk factors, treatment uptake and
17 outcomes.

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Table 1. Included country characteristics

	Sample	Country								
		Portugal	Bulgaria	Poland	Italy	Spain	Netherlands	UK	Greece	Germany
MENDit ^a score (SD)	3.25 (1.18)	3.67	2.16	1.16	4.00	1.83	4.33	4.67	2.67	4.33
QuIRC domain mean score (SD)	N=193									
Living Environment	60.59 (15.32)	59.18 (15.64)	54.10 (18.06)	49.02 (12.87)	64.75 (9.57)	46.48 (16.81)	70.14 (13.95)	67.05 (10.75)	58.05 (7.60)	73.81 (7.92)
Therapeutic Environment	52.15 (9.58)	47.82 (10.55)	45.56 (12.17)	47.47 (8.58)	52.60 (6.83)	55.72 (8.04)	51.58 (4.86)	64.52 (6.03)	52.13 (8.59)	51.78 (7.22)
Self-management and Autonomy	56.16 (15.38)	49.63 (16.47)	44.95 (19.19)	44.06 (9.61)	53.18 (9.11)	46.86 (10.28)	65.98 (9.83)	68.69 (11.03)	59.92 (11.21)	71.85 (8.28)
Social Interface	48.45 (14.86)	51.96 (19.33)	45.76 (17.68)	40.09 (14.04)	49.98 (11.85)	59.55 (16.38)	47.01 (33.38)	53.95 (12.74)	47.31 (11.24)	40.32 (11.52)
Treatments and Interventions	50.74 (9.13)	46.49 (10.13)	48.48 (11.37)	46.24 (7.72)	50.55 (6.69)	53.97 (9.55)	52.74 (7.06)	59.50 (8.03)	47.37 (6.39)	51.57 (8.46)
Human Rights	56.86 (13.02)	48.70 (11.85)	52.36 (14.39)	52.97 (10.41)	48.11 (9.60)	53.73 (9.10)	70.78 (6.44)	69.7 (9.19)	52.94 (11.75)	65.74 (5.71)
Recovery-based Practice	52.72 (12.72)	44.16 (13.41)	45.48 (15.94)	46.08 (10.26)	48.43 (8.12)	55.42 (8.80)	51.71 (8.65)	65.92 (9.67)	56.04 (11.71)	62.39 (8.77)
Mean service user rating scores (SD)	N=157 9									
Quality of Life	4.64 (0.91)	4.63 (0.87)	4.19 (0.89)	4.60 (0.85)	4.61 (0.75)	4.63 (0.94)	4.79 (0.89)	4.52 (0.86)	4.92 (1.02)	4.88 (0.89)
Autonomy	60.15 (12.31)	52.41 (11.90)	47.93 (9.72)	51.28 (7.46)	65.30 (7.17)	55.59 (10.92)	72.65 (7.45)	67.13 (8.29)	67.18 (11.06)	64.54 (7.54)
Experiences of Care	17.45 (4.82)	15.71 (4.79)	16.12 (4.61)	17.18 (5.17)	18.56 (4.53)	16.58 (4.84)	18.96 (4.60)	18.90 (5.36)	17.26 (4.19)	18.08 (4.14)
Therapeutic Milieu	17.58 (4.23)	17.39 (4.31)	17.05 (4.04)	18.01 (4.08)	18.01 (4.11)	16.83 (4.36)	17.34 (4.06)	16.91 (4.40)	19.68 (3.91)	17.38 (4.13)

^a Mental Health Service Deinstitutionalization Measure

Table 2. Main effects of deinstitutionalization on quality of care

	Living Environment	Therapeutic Environment	Treatments and Interventions	Self-management and Autonomy	Social Interface	Human Rights	Recovery-based Practice
Model	B	D	D	D	B	D	D
Intercept, mean (s.e.)	33.62 (3.40)	68.15*** (8.14)	69.96*** (9.68)	39.84 (26.06)	49.42** (4.97)	75.18* (32.77)	67.77*** (20.10)
Fixed effects parameter estimate (s.e.)							
DI ^a	6.14*** (0.93)	3.58*** (0.80)	3.36*** (0.96)	7.41** (2.68)	0.13 (1.39)	6.62 (3.41)	4.87* (2.05)
Facility type ^b	12.05*** (2.01)	-2.64* (1.30)	-2.53 (1.40)	5.53* (2.21)	-5.14* (2.42)	0.84 (1.91)	0.40 (1.96)
Staff/service user ratio ^c	-1.85 (2.07)	1.51 (1.37)	0.55 (1.52)	0.81 (2.56)	0.88 (2.60)	2.26 (2.25)	0.24 (2.25)
Presence of max length of stay ^d	-3.35 (2.32)	8.88*** (1.52)	6.50*** (1.64)	1.69 (2.56)	9.63*** (2.79)	1.04 (2.21)	5.85** (2.27)
Mental Health legislation ^e		-0.13 (0.10)	-0.21 (0.12)	0.16 (0.37)		-0.35 (0.45)	0.08 (0.27)
Stigma ^f		-5.28*** (1.65)	-5.22** (1.97)	-3.10 (5.35)		-7.01 (6.75)	-6.93 (4.12)
Random parameters variance (s.e.)							
Level 1 (country)	3.71 (5.77)	1.35 e-17 (2.41 e-16)	1.13 (2.65)	31.78 (24.32)	14.72 (13.36)	60.36 (41.25)	16.56 (13.87)
Level 2 (facility)	137.83 (14.45)	58.72 (6.09)	64.85 (6.80)	141.14 (14.82)	184.32 (19.36)	102.87 (10.81)	113.55 (11.92)

^a deinstitutionalization (Mental Health Service Deinstitutionalization Measure, MENDit)

^b hospital = 0; community = 1

^c Full-time equivalent staff per service user

^d no = 0; yes = 1

^e Year since introduction of legislation

^f Discrimination and Stigma Scale (DISC)

* $p < 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Table 3. Main effects of deinstitutionalization on service user ratings of care

	Autonomy	Quality of Life	Experiences of Care	Therapeutic Milieu
Model	H	E	F	F
Intercept, mean (s.e.)	70.38*** (22.05)	4.48*** (0.21)	15.23*** (0.86)	17.54*** (0.80)
Fixed effects parameter estimate (s.e.)				
DI ^a	7.11** (2.30)	0.05 (0.06)	0.45 (0.25)	-0.10 (0.23)
Facility type ^b	2.99* (1.19)		0.92* (0.40)	0.75* (0.33)
Staff/service user ratio ^c	0.20 (1.42)		-0.05 (0.45)	0.15 (0.37)
Presence of max length of stay ^d	-0.37 (1.39)		0.91 (0.48)	-0.62 (0.39)
Mental Health legislation ^e	-0.16 (0.31)			
Stigma ^f	-6.43 (4.54)			
Random parameters variance (s.e.)				
Level 1 (country)	27.89 (19.00)	0.04 (0.03)	0.46 (0.39)	0.49 (0.36)
Level 2 (facility)	32.67 (4.23)	0.06 (0.02)	2.81 (0.57)	1.35 (0.36)
Level 3 (service user)	54.66 (2.08)	0.73 (0.03)	19.38 (0.74)	15.98 (0.61)

^a deinstitutionalization (Mental Health Service Deinstitutionalization Measure, MENDit)

^b hospital = 0; community = 1

^c Full-time equivalent staff per service user

^d no = 0; yes = 1

^e Year since introduction of legislation

^f Discrimination and Stigma Scale (DISC)

* $p < 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

Table 4. The clinical impact of a change in progress towards deinstitutionalization on projected national mean QuIRC domain scores

	Mean QuIRC ^a domain score							
Country (mean MENDit ^b score)	Poland (1.16)	Spain (1.83)	Bulgaria (2.16)	Greece (2.67)	Portugal (3.67)	Italy (4.00)	Germany (4.33)	Netherlands (4.33)
Living Environment (60.59)								
2005 MENDit score	49.02	46.48	54.1	58.05	59.18	64.75*	73.81*	70.14*
MENDit = 3.25	61.85*	55.20	60.79*	61.61*				
MENDit = 4.67	70.57*	63.92*	69.51*	70.33*	65.32*	68.86*	75.90*	72.23*
Therapeutic Environment (52.15)								
2005 MENDit score	47.47	55.72*	45.56	52.13	47.82	52.60*	51.78*	51.58*
MENDit = 3.25	54.95*	60.80*	49.46	54.21*				
MENDit = 4.67	60.04*	65.89*	54.55*	59.29*	51.40	55.00*	53.00*	52.80*
Treatments and Interventions (50.74)								
2005 MENDit score	46.24	53.97*	48.48	47.37	46.49	50.55	51.57*	52.74*
MENDit = 3.25	53.26*	58.74*	52.14*	49.32				
MENDit = 4.67	58.03*	63.51*	56.91*	54.09*	49.85	52.80*	52.71*	53.88*
Self-management and autonomy (56.16)								
2005 MENDit score	44.06	46.86	44.95	59.92*	49.63	53.18	71.85*	65.98*
MENDit = 3.25	59.55*	57.38*	53.03	64.22*				
MENDit = 4.67	70.07*	67.90*	63.55*	74.74*	57.04*	58.14*	74.37*	68.50*
Social Interface (48.45)								
2005 MENDit score	40.09	59.55	45.76	47.31	51.96*	49.98*	40.32	47.01
MENDit = 3.25	40.36	59.73*	45.90	47.39				
MENDit = 4.67	40.55	59.92*	46.09	47.57	52.09*	50.07*	40.36	47.05
Human Rights (56.86)								
2005 MENDit score	52.97	53.73	52.36	52.94	48.7	48.11	65.74*	70.78*
MENDit = 3.25	66.81*	63.13*	59.58*	56.78				
MENDit = 4.67	76.21*	72.53*	68.98*	66.18*	55.32	52.55	67.99*	73.03*
Recovery-based Practice (52.72)								
2005 MENDit score	46.08	55.42*	45.48	56.04*	44.16	48.43	62.39*	51.71
MENDit = 3.25	56.26*	62.34*	50.79	58.86*				
MENDit = 4.67	63.17*	69.25*	57.70*	65.78*	49.03	51.69	64.05*	53.37*

^a Quality Indicator for Rehabilitative Care

^b Mental Health Service Deinstitutionalization Measure

*Denotes clinically important increase in country mean score

Table 5. The clinical impact of a change in progress towards deinstitutionalization on projected national mean service user ratings of care

Country (mean MENDit ^a score)	Poland (1.16)	Spain (1.83)	Bulgaria (2.16)	Greece (2.67)	Portugal (3.67)	Italy (4.00)	Germany (4.33)	Netherlands (4.33)
Quality of Life ^b (4.64)								
2005 MENDit score	4.60	4.63	4.19	4.92*	4.63	4.61	4.88*	4.79*
MENDit = 3.25	4.70*	4.70*	4.24	4.95*				
MENDit = 4.67	4.78*	4.77*	4.32	5.02*	4.68*	4.64*	4.90*	4.81*
Autonomy ^c (60.15)								
2005 MENDit score	51.28	55.59	47.93	67.18*	52.41	65.3*	64.54*	72.65*
MENDit = 3.25	66.14*	65.69*	55.68	71.30*				
MENDit = 4.67	76.24*	75.78*	65.78*	81.40*	59.52	70.06*	66.96*	75.07*
Experiences of Care ^d (17.45)								
2005 MENDit score	17.18	16.58	16.12	17.26	15.71	18.56*	18.08*	18.96*
MENDit = 3.25	18.12*	17.22	16.61	17.52*				
MENDit = 4.67	18.76*	17.86*	17.25	18.16*	16.16	18.86*	18.23*	19.11*
Therapeutic Milieu ^e (17.58)								
2005 MENDit score	18.01*	16.83	17.05	19.68*	17.39	18.01*	17.38	17.34
MENDit = 3.25	17.80*	16.69	16.94	19.62*				
MENDit = 4.67	17.66*	16.55	16.80	19.48*	17.29	17.94*	17.35	17.31

^a Mental Health Service Deinstitutionalization Measure

^b Manchester Short Assessment of Quality of Life

^c Resident Choice Scale

^d Your Treatment and Care

^e Good Milieu Index

*Denotes clinically important increase in country mean score