


# The role of local inpatient psychiatric units and general practitioner on continuity of care in Northern Norway: A case-register study

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## Abstract

**Objectives:** The general practitioners' (GP) role in the care of mental health patients has received increased attention. The literature underlines the need for integration of primary and specialist services, but cross-boundary continuity for patients with severe conditions may be particularly poor. The aim of this study was to analyze the collaboration between primary care and different models of specialized psychiatric services for patients with severe conditions.

**Methods:** We compared a local and a centralized model of mental health care. Service utilization over a 5-year period was studied.

**Results:** Findings suggest that a local institution-based model of services positively affects the use of both GP and specialist outpatient care, with most inpatients utilizing both GP and specialist outpatient consultations. In the centralized model, a substantial proportion of inpatients only used GP outpatient care. Furthermore, inpatients that used both GP and specialist outpatient services received more of both services compared to those who did not enter specialist outpatient care at all.

**Conclusion:** Local inpatient units may positively affect continuity of care and collaboration between general practitioners and specialist psychiatric services compared to more traditional hospital units, probably because better functional integration of services, better facilitation of clinical alliances/relationships, or a more network-oriented treatment philosophy.

## KEYWORDS

continuity of care, general practitioners, mental health, psychiatry

## 1 | INTRODUCTION

The deinstitutionalization of psychiatry has in its essence been a downsizing of central psychiatric institutions in favor of more outpatient- and community-based services (Thornicroft & Bebbington, 1989). The early concept of community psychiatry was very much

influenced by the American psychiatrist Alexander Leighton (1982) and his « Bristol Mental Health Center » characterized by rapid and exact diagnostics, pragmatic and systematic research, and identification of local resources and collaborating agencies (Leighton, 1982). In the light of current and broad healthcare reforms, the general practitioners have gradually been given a more important role in such local

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treatment and care of psychiatric patients. However, the few studies on the functional integration of primary care and psychiatric services that exist suggests that cross-boundary continuity of care for these patients may be particularly poor (Bindman et al., 1997; Fleury, 2005; Fleury, Bamvita, Farand, & Tremblay, 2008; Fleury, Imboua, Aube, Farand, & Lambert, 2012b; Lang, Johnstone, & Murray, 1997; Mykletun, Knudsen, Tangen, & Øverland, 2010; Newman, O'Reilly, Lee, & Kennedy, 2015; Reilly S, Hann, Reeves, Nazareth, & Lester, 2012; Vazquez-Barquero et al., 1992).

"Continuity of care" has long been a key concept used both as a measure of outcome as well as a strategic priority in psychiatric services research and represents the availability of a full range of mental health care tailored to the needs of individual patients over different service providers (Omer, Priebe, & Giacco, 2015). Recent results suggest that systems that facilitate continuous clinical relationships between patient and therapist may be better than systems with specialized teams for these patients (Omer et al., 2015). This may render the general practitioner as even more important in the systems of care for psychiatric patients as the continuous provider of a broad array of health care for their patients. The aim of this study was therefore to examine the collaboration and integration of general practitioners with community psychiatry at two different models of psychiatric service systems in Norway for patients with serious mental health problems.

## 1.1 | Mental health care in Norway

The present Norwegian system of mental health services is characterized by an extensive decentralization of both outpatient and inpatient care. While the traditional central psychiatric hospitals still exist, high quality psychiatric services are now locally available at the "District Psychiatric Centers" (DPCs). These centers often differ in organization and outline. Some emphasize local outpatient services in combination with centralized regional hospitals, and others offer inpatient care at smaller local institutions (The Directorate for Health and Social Affairs, 1999, p. 2006). Such organizational varieties may have implications for patients' patterns of care, and we have previously described differences in utilization of inpatient treatment, rates of coercion, emergency admissions, and continuity of care between outpatient and inpatient care (Myklebust et al., 2009; Myklebust, Sorgaard, Rotvold, & Wynn, 2012; Myklebust, Sorgaard, & Wynn, 2014).

The local general practitioners (GPs) are also regarded important in the care for patients with mental health problems. Their work reregulated under "The Regular GP Scheme," an agreement with the local authorities to be available for a defined list of maximum of 2500 persons for all health issues, including mental problems (Norwegian Parliament, 1999). GPs are to initially diagnose and treat patients and only eventually further admit them to specialist psychiatric services for advice on medication, diagnosis, or further psychotherapy. Patients are subsequently discharged with recommendations to the GPs for further care and measures (The Directorate for Health and Social Affairs, 2006).

To study the collaboration between general practitioners and different models of psychiatric services, we examined whether having psychiatric beds at local DPCs rather than at a central hospital affects the continuity of care for individual patients with severe mental health conditions.

## 2 | METHODS AND MATERIALS

The present study is a retrospective cohort study of all psychiatric patients in two areas in North Norway, comparing the DPC of Vesterålen and of Lofoten in the County of Nordland. They represent an interesting object for mental health services research, because they are organized quite differently even though almost identical catchment area characteristics (Myklebust et al., 2009).

### 2.1 | Study areas

The geographic areas of Lofoten and of Vesterålen strongly resemble each other in infrastructure, ways of subsistence, demographic and social structures, and epidemiological characteristics. They are characterized by small towns and communities along the coast, where the most people work in fisheries, agriculture, tourism, industry, education, and public service. Communications to the county capital of Bodø are good, and local administrative institutions and educational facilities are in line with modern Norwegian standards. The population is very similar in terms of gender, age, and educational levels. We examined the epidemiological characteristics of the two areas by the use of publicly available statistics of living conditions, socioeconomic features, and demography (Jarman, 1983; Sundquist, Malmstrom, Johansson, & Sundquist, 2003). A "Care Need Index" was calculated and weighted for size of the populations of the two catchment areas (Myklebust et al., 2009). The estimated needs were remarkably similar, as the index of Lofoten was only slightly higher ( $45.4/42.2=1.07$ ) than that of Vesterålen ( $54.6/57.8=0.94$ ). To further verify this, we compared the rate of persons on disability pension with psychiatric diagnoses in the two areas, which turned out to be almost identical (Myklebust et al., 2009). Tables 1 and 2 give an overview of the similar characteristics of the two catchment areas.

### 2.2. Service models

The regions' two DPCs have on the other hand developed very differently. The one in Lofoten resembles local community mental health centers as there is only outpatient services locally with beds at the central mental hospital in Bodø. At Vesterålen, the psychiatric beds are integrated in the local DPC with the outpatient clinics. The two psychiatric services may be termed a "local institution-based model" (i.e., in Vesterålen) and a "central institution-based model" (i.e., in Lofoten). The main differences are illustrated in Figure 1.

In previous studies, we found that the rates of hospitalization were remarkably alike for the two models, with a population rate of 7.7

**TABLE 1** Characteristics of catchment areas for Vesterålen and for Lofoten, County of Nordland, Norway, year of 2010 (2005)

	Vesterålen		Lofoten	
Cities	2		2	
Airports	1		1	
Larger harbors <sup>a</sup>	2		2	
Travel time by air to county capital (central mental Hospital) <sup>b</sup>	30 min		25 min	
Total number of inhabitants <sup>c</sup>	30,465		22,469	
Inhabitants aged 18–65 <sup>c</sup>	18,212 (59.7%)		12,734 (56.7%)	
	Male	Female	Male	Female
Young <sup>d</sup>	2082 (11.4%)	1899 (10.4%)	1641 (12.2%)	1474 (11.0%)
Middle aged	4111 (22.6%)	3989 (22.0%)	3029 (22.6%)	2916 (21.7%)
Elderly	3147 (17.3%)	2984 (16.4%)	2285 (17.0%)	2072 (15.4%)
Sum	9340 (51.3%)	8872 (48.7%)	6955 (51.8%)	6462 (48.2%)
CNI versus catchment area population share (%) <sup>d</sup>	54.6 (57.8)		45.4 (42.2)	
Persons on disability pension (psychiatric d.) <sup>e</sup>	617 (19.9/1000 inhab.)		447 (20.2/1000 inhab.)	

Abbreviation: CNI, Care Need Index.

<sup>a</sup>Called by cruise ships, national costal liner "Hurtigruten" and costal ferries.

<sup>b</sup>Widerøes Flyselskap A/S (Airline Company).

<sup>c</sup>By Statistics Norway (year of 2010).

<sup>d</sup>Young 18–29, middle 30–49, and elderly 50–65 4 By Statistics Norway (year of 2005).

<sup>e</sup>Rikstrygdeverket (year of 2005).

inpatients per 1000 (Vesterålen) versus 8.4 per 1000 (Lofoten) and a bed-utilization rate of about 1 bed per 1000 inhabitants in both. This suggests that the use of inpatient treatment is quite similar in the two systems, regardless if the patients are cared for at local or central inpatient units (Myklebust et al., 2011; Myklebust et al., 2009).

Concerning primary care, the rate of GPs per 1000 inhabitants (from 18 years old) is quite similar in the two areas. In Lofoten, there is 1.3 GPs per 1000 inhabitants versus 1.4 GPs per 1000 inhabitants in Vesterålen (ssb.no, 2016).

In sum, the main difference between the two areas is the organization and structure of the psychiatric services, not the extent of GPs, catchment area characteristics or epidemiological features of the population. There are no other providers of psychiatric services in the two areas, and the geographic distance implicates little or no leakage of service use outside the study areas (Myklebust et al., 2009). We considered all presumably important variables of epidemiology, demography, diagnoses, and service utilization and structure accounted for, with no obvious systematic bias. The study may therefore resemble a natural- or quasi-experimental design, rarely found in health services research.

## 2.2 | Data

By comprehensive permissions from the Norwegian Datatilsynet (data protection agency), we used the records of the central registers of Norwegian Patient Register (NPR) and The Norwegian Health

Economics Administration (HELFO) for all patients treated for mental health problems in the two areas over the 5 years 2008–2012. The total prevalence sample for the years of 2008–2012 included 19,575 individual patients between 18 and 105 years of age. To investigate the patterns of utilization for patients with only severe psychiatric problems, we extracted a sub-sample of 971 patients that had at least one psychiatric inpatient stay during the observational period. "Severity" was hereby not defined solely by diagnosis but also actual use of comprehensive psychiatric care. Only 12 patients were treated in both service systems, and less than 0.4% were outside residents. These were excluded from further analyses. Missing data were collected from medical records when possible.

## 2.3 | Analysis

The NPR-registry contains demographic variables, use- and service variables, and clinical variables for all patients in the psychiatric specialist services. All clinical variables in the registries were registered by clinical staff during individual treatment courses. The diagnoses are set by the International Classification of Diseases (ICD-10) system.

The HELFO registry contains the professional activities of general practitioners, electronically reported into a central reimbursement register at The Norwegian Health Economics Administration (HELFO) with a response exceeding 98% from 2008 and onwards (helfo.no, 2020). The records contain demographic variables, diagnoses- and treatment variables. The diagnostic variables are based

TABLE 2 Individual- and treatment characteristics of inpatients' in two systems of mental health services

Service system		Central institution system N=444	Local institution system N=527
Age (mean)		42.2 (SD=14.589)	41.7 (SD=14.220)
Gender	Female	249 (56.1%)	295 (56.0%)
	Male	195 (43.9%)	232 (44.0%)
Diagnosis	Z004—Observation	4 (0.9%)	11 (2.1%)
	F10—Substance abuse	23 (12.6%)*	33 (4.1%)*
	F20—Schizophrenia/delusion	49 (11.0%)	69 (5.8%)
	F30—Affective (mood)	127 (28.6%)	167 (31.7%)
	F40—Neurotic, stress-related	151 (34.0%)	151 (28.7%)
	F50—Behavioral syndromes	14 (3.2 %)	16 (3.0 %)
	F60—personality disorders	18 (4.1 %)	8 (1.5%)
	F70—Mental retardation	18 (4.1 %)	22 (4.2 %)
	F80—Disorders of psychological development	9 (2.0%)	6 (1.1%)
	F90—Disorders with onset childhood and adolescence	14 (3.2%)	32 (6.1%)
	F03—Organic disorders	17 (3.8%)	12 (2.3%)
Coercion	At least once	54 (12.2%)	51 (9.7%)
	None	390 (87.8%)	476 (90.3%)
Treatment volume (median)	Sum of inpatient stays (d & n.)	9	14**
	Psychiatric outpatient (consultations)	13	5.5
	Day-care (days)	16	12.5
	General practitioner outpatient (consultations)	20	19

Note: A 5-years registered prevalence sample (2008–2012), N=971.

\* $p < 0.05$ , \*\* $p < 0.01$  when service models are compared

on the IPC-system that is not directly comparable to the ICD-10, and only the latter were used.

These two registers were linked across three service levels (GPs, District Psychiatric Centers, and Central Mental Hospital) by all individual patients' 11-digit personal identity numbers. The sample therefore represents the totality of mental health patients in the two areas over the observational period, regardless of whether they were treated in primary care, local DPCs, or the Central Mental hospital. Consequently, the data at hand give a complete picture of the utilization of mental health services for the population of the region.

The variables studied were gender, age, diagnoses, unit of care, and volume of utilization (length of inpatient stays, days in day-hospital, number of outpatient consultations, number of consultations at GPs, and if the patients had been admitted to involuntary treatment [coercion]).

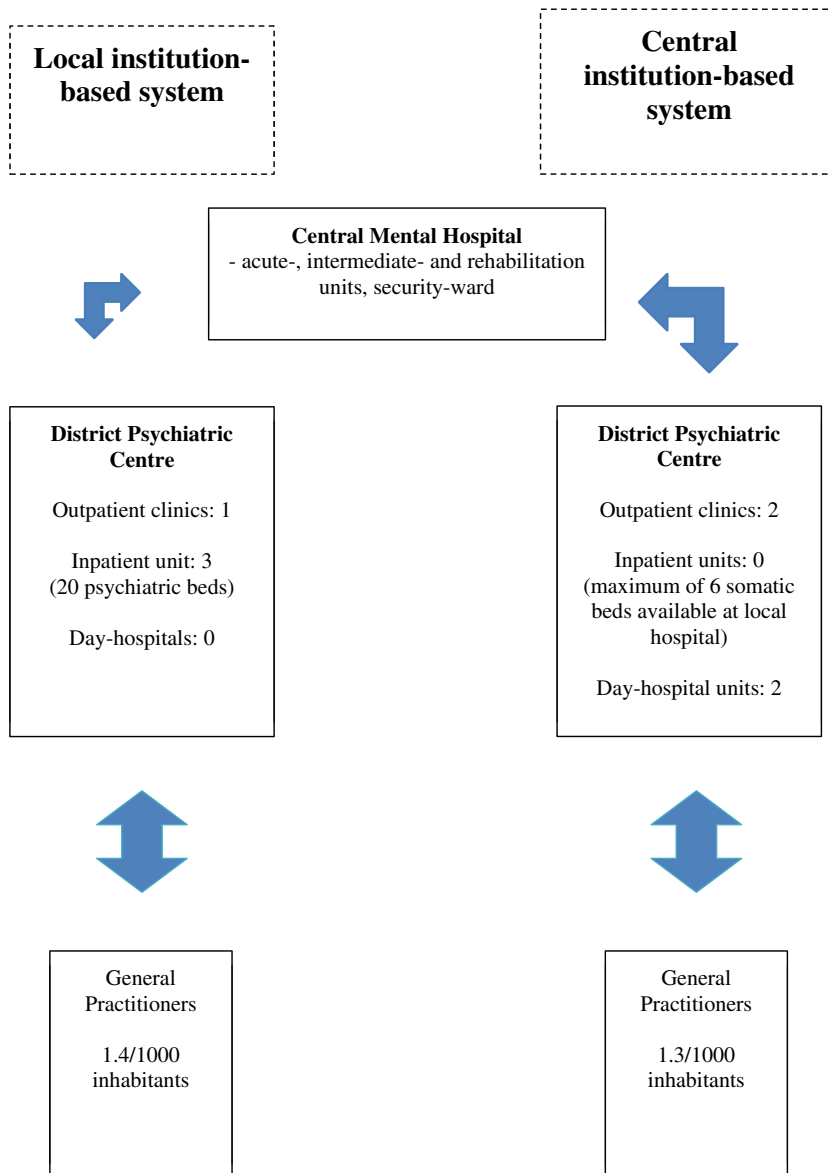
The patients' diagnoses were grouped into the categories in the ICD-10 diagnostic system: organic mental disorders (F00–09), substance abuse disorders (F10–19), psychotic disorders (F20–29), affective disorders (F30–39), anxiety disorders (F40–49), behavioral syndromes and disturbances (F50–59), personality disorders (F60–69), mental retardation (F70–79), developmental disorders (F80–89)

and unspecified disorders (F90–99). Although the size of the different categories varied considerably, we did not regroup them for the statistical analysis because of no obvious or theoretical assumption on how they otherwise would be related.

Bivariate differences were tested by Chi-square tests, ANOVA, and nonparametric tests (Mann–Whitney U). A multivariate analysis was performed in order to control for possible confounders and interaction effects, where all variables were entered in a stepwise manner as predictors in a logistic regression model. Due to skewed distributions, the continuous variables were log transformed before being entered into the model.

### 3 | RESULTS

Initially, the two patient populations were compared in a bivariate analysis of all variables to reveal possible major differences relevant for further analyses. There were no significant differences in age or gender distribution between the populations. In the centralized model, 56.1% of the inpatients were females compared to 56.0% in the other model. The difference in mean age was 42.2 (SD=14.589)



**FIGURE 1** Outline of the Norwegian mental health service systems in the sectors of Vesterålen and of Lofoten, County of Nordland, Norway

versus 41.7 (SD=14.220). There were no significant differences in the diagnoses between the populations, except for a somewhat higher ratio in the central institution system for substance abuse ( $p < 0.5$ ). There was no significant difference in the use of coercion between the models, in line with an overall trend of reduced involuntary treatment in the Norwegian mental health services in the last decade (Myklebust et al., 2014). For utilization patterns, the only difference was found in inpatient treatment, where the median length of stay tends to be somewhat longer for the local institution model than the other. Results are presented in Table 2.

To further examine the patterns in collaborative use of primary and specialist services, we therefore split the population into two subgroups:

1. Inpatients who received only GP care before or after discharge
2. Inpatients who also received specialist outpatient consultations before or after discharge

When comparing these groups on outpatient service utilization (combination of psychiatric outpatient care and GP consultations vs. GP consultations only), an interesting pattern emerged between the two groups. Inpatients that used only GPs as outpatient care used considerably less consultations and also had shorter psychiatric inpatient stays than inpatients that used both GP care and psychiatric outpatient services. Results are presented in Table 3.

When we further compared these results across the service models, we found that almost twice as many patients in the local institution model utilized a combination of both GP- and specialist outpatient consultations, compared to the central institution model where as much as half of the inpatients used GPs as their only outpatient treatment (Table 4). A Phi-coefficient of 0.364 ( $p = 0.001$ ) indicates a medium effect size of inpatient location (Cohen, 1988).

To test possible confounding of variables for these differences in utilization, we used a logistic regression model with "GP care only"

TABLE 3 Use of GP consultations for inpatients with or without local outpatient psychiatric care

Care combinations	GP outpatient care only	GP and outpatient specialist care
All patients	N=288	N=683
Mean number of GP consultations	20.5**	37.7**
Mean number of inpatient days & nights	13.6**	49.5**
Mean number of specialist outpatient consultations	-	25.0
Mean number of specialist days in day-hospital	-	10.3

Note: 5-year registered prevalence sample (2008–2012), N=971.

Abbreviation: GP, general practitioner.

\*\* $p < 0.001$  when groups are compared.

Combinations of care	Central institution system	Local institution system
GP outpatient care only	N=180 (40.5%)**	N=108 (20.5%)**
GP and outpatient specialist care	N=264 (59.5%)**	N=419 (79.5%)**

Note: 5-year registered prevalence sample (2008–2012), N=971.

Abbreviation: GP, general practitioner.

\*\* $p < 0.001$  when groups are compared.

Variable	B	Sig.	Exp (B)	95% CI for Exp (B)	
Gender (F=0, M=1)	0.493	0.006	1.551	1.131	2.127
Age	-0.019	0.001	0.981	0.970	0.993
F3—Affective disorders	1.949	0.004	5.437	1.744	16.947
F9—Unspecified disorders	1.720	0.029	4.489	1.170	17.217
Service system (central=0, local=1)	0.995	0.000	2.685	1.971	3.711
Sum of inpatient nights & days pr. patient	0.021	0.000	1.021	1.015	1.028
Constant	-0.837	0.180	0.433	-	-

Note: County of Nordland, Norway, 5-year registered prevalence sample (2008–2012), N=971.

versus "both GP and psychiatric specialist outpatient care" (Y/N) as the dependent variable. All predictors, including patient variables and treatment variables, were entered stepwise. The total model containing all predictors was statistically significant ( $\chi^2 217.664$ ,  $df=15$ ,  $p < 0.001$ ), with an overall goodness-of-fit ( $-2 \text{ Log likelihood}$ ) at 962.989 ( $p < 0.001$ ). A sensitivity of 41.7% and a specificity of 91.4% indicated that the model could distinguish between inpatients in collaborative outpatient care or not. The model explained between 20.1% (Cox & Snell R Square) and 28.5% (Nagelkerke R Square) of the total variance. The model suggests that both individual variables and system variables predict the use of collaborative services. Six covariates with a unique and statistically significant contribution are shown in Table 5.

The strongest predictors were the diagnostic categories of affective disorders and unspecified disorders, and service system. Also, male gender, age (decline), and increased length of inpatient stay contributed to the likelihood of inpatients' use of both GP and specialist psychiatric outpatient care.

TABLE 4 Combinations of GPs and psychiatric outpatient care for all inpatients in a central-institution versus a local-bed system of mental health services

TABLE 5 Logistic regression model of collaborative care for all inpatients (n/y) for a central-institution versus a local institution system of mental health services

In sum, for the particular aim of this study, the results suggests that inpatients in the local institution model was more than three times more likely to use a combination of both GP and specialist outpatient care compared to the patients in the centralized model, and that patients in combined care also used more of all types of services.

## 4 | DISCUSSION

In our retrospective cohort study based on comprehensive case registries of all patients in two different models of mental health care services, the main findings suggest that organization of services may exert a profound effect on the utilization of primary and specialist services. Inpatients in a local institution-based model utilized both primary- and specialist psychiatric outpatient care to a higher degree than inpatients in a central institution-based model. Moreover, inpatients that used both GP and psychiatric outpatient services

combined received more of all treatments compared to those who used GP as outpatient care only.

Individual variables like diagnosis and length of inpatient stay modified these findings, but service model had a considerable independent effect suggesting that local inpatient units may positively influence the engagement from GPs and overall service use compared to central mental institutions.

The recent distinction between "continuity systems" with stable clinical relationships between patient and therapist versus "specialization systems" dependent on the condition of the patient may at least partly explain our results (Omer et al., 2015). Stable clinical alliance between the therapist and the patient is widely described in the literature to be essential for a good effect of psychotherapy (Barnicot et al., 2012; Degnan, Seymour-Hyde, Harris, & Berry, 2016; Green et al., 2008; Littauer, Sexton, & Wynn, 2005), as well as their importance to avoid gaps in service delivery after discharge from psychiatric hospital (Boyer, McAlpine, Pottick, & Olfson, 2000; Compton, Rudisch, Craw, Thompson, & Owens, 2006; Forchuk, Reynolds, Sharkey, Martin, & Jensen, 2007). In our "local institution-based" system, individual therapists can keep continuous contact with their patients over the transition from inpatient to outpatient care, whereas in our "centralized model," this may be difficult. This continuity may exert an effect at both primary- and specialist outpatient engagement after discharge. Although our previous research suggests that the distance to mental health hospital may not affect the rate and utilization of inpatient treatment (Myklebust et al., 2009), it may have an impact on the integration of care at both GP and specialist levels of services.

The results may shed some lights on possible shortcomings of the Goldberg and Huxley theoretical framework on patients' "pathways to care" (Goldberg, & Huxley, 1980). Their stage model has been central in the study of health services research for almost 4 decades and describes a series of filters in the path from community-to hospital services that patients have to pass on their way toward relevant care and treatment. What may be less obvious from the model is the pathways from specialist to lower levels of services. In a wider context, this may tap into how and to what extent health care systems are functionally integrated. Although a relationship between service organization and patient outcome is difficult to document, research suggests that the concept of "systems integration" at all levels of care are essential (Bindman et al., 1997; Durbin J, Streiner, & Pink, 2006; Fleury, 2005; Greenberg & Rosenheck, 2005; Hoge & Howenstine, 1997).

One aspect of such integration may be how the discharge of inpatients is coordinated with local outpatient services (Thorncroft & Tansella, 1999). Discussion and exchange of relevant clinical information are of importance for continuity of care, but may be halted if units are located at geographically distance from each other (Farrell, Blank, Koch, Munjas, & Clement, 1999). It may certainly be easier to hold continuous formal and informal contact between specialist clinicians and GPs in a model of local inpatient units, than in a model based on a more centralized mental hospital. This may explain why the patients in our study who fall out of specialist

outpatient care after hospitalization also use considerably less of GP consultations. It may be that close and regular contact between health professionals is of vital importance for continuous collaboration around patients.

A related explanation may be that inpatient units differ in their culture and treatment orientation. In a previous study, we found that DPC-inpatient units emphasized systemic and network orientation more than hospital units (Myklebust et al., 2011). So, if the majority of inpatients are treated at local DPC units, this may implicate that the GPs of these patients are engaged to a higher degree than for patients treated in a central mental hospital with more traditional medical orientation.

Our data lend some support to individual-patient variables as important for inpatients use of outpatient services. Both the contribution of diagnoses of and length of inpatient stay in the univariate model suggest that seriousness of disorders plays a role, but that this is difficult to disentangle. A condition of affective disorder may enhance individual patients' motivation to utilize outpatient care because of the subjective suffering, or because of effective treatments present. A related explanation may be that some conditions such as psychosis-spectrum disorder or substance abuse makes it more difficult to orientate and make use of services in complex environments (Sørgaard, Nivison, Hansen, & Øiesvold, 2011). These patients may more easily fall out of outpatient care after discharge, or also they may be more ambivalent to forth treatment. Our results do however not suggest that inpatients with psychosis-spectrum disorders are more apt to fall out of contact with outpatient care than others, which further points to supra-individual factors as important for care utilization.

#### 4.1 | Strengths and limitations

One of the major advantages of this study is the control over possible important variables of the sample. The close to experimental design is rare in health services research and lends strength to the results. We use several approaches to account for possible relevant confounding variables, both in previous publications and by the statistical methods used in this study. Hence, we believe that this close to natural experiment lends support to the idea that organizational factors may affect the outpatient collaboration between primary care and specialist psychiatry.

Our sample of 971 inpatients may not be considered very large. Nevertheless, as there were significant differences in both the univariate and multivariate analysis, we may claim that the associations we found are likely to be quite strong.

Being restricted to use ordinary clinical data, the reliability and validity of the diagnostics may also be questioned. The observed differences in diagnoses (Table 2) could in part be attributed to differences in the use of diagnostic tools or registration procedures between the systems. There is also a relatively high proportion of patients in the observation category that may not yet have been

assessed or not fulfilled criteria for a psychiatric diagnosis during the inpatient stay.

The significant differences found may also be a bias in the selection of patients into psychiatric care in the two systems. The case register at hand cannot resolve this issue. A future study involving a closer assessment of the patients on levels of disability and standardized procedures for diagnostic practice could reveal whether one of the systems selects more disordered or disabled persons into treatment than the other.

The use of "inpatient care" as an inclusion criterion may therefore be sound to encompass patients with serious mental health problems, although it may not solve the issue of possible different patient populations. However, as the two catchment areas compared in this study are very similar demographically and in other respects, we believe that it is unlikely that the population in the two areas differ substantially.

It is also a limitation of the study that relatively few other individual variables on individual characteristics of patients. The statistical impact of system variables could be reduced if additional clinical and psychosocial variables were included, and if we could incorporate variables that degree of disability, financial status, employment, educational level, ethnicity, attitudes of doctors, caregivers and patients, and so on, it might alter the results and prove important to the use of continual care outside hospitalization. On the other hand, the explained level of variance in the model suggests that it is relatively stable, even though we lack variables that could be of importance.

We also lack information about the quality of care. However, both service models are in accordance with national guidelines for service delivery and have adopted current clinical standards. However, in the multivariate analyses, we have used the intensity of treatment by volume of both inpatient and outpatient care for individual patients, a point of relevance missing in many studies in health services research.

While we may not fully generalize our results to other systems, we believe the present study adds to the literature on contemporary European mental health care. The importance of such studies in a range of different areas for informed policy planning has previously been highlighted (Fleury, 2005; Fleury, Imboua, Aube, & Farand, 2012a; Omer et al., 2015; Salvador-Carulla et al., 2008; Verdoux, 2007).

## 5 | CONCLUSION

Primary care involvement in the care for mental health patients depends on organizational aspects of the psychiatric specialist services' as well as individual factors of the patients. Smaller, locally based inpatient units may positively affect continuity of care at the level of both general practitioners and specialist outpatient services, more than traditional central mental hospitals. Higher functional integration of services, better facilitation of stable clinical alliances/relationships, and a more network-oriented treatment philosophy in local inpatient units may explain this difference.

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## CONFLICT OF INTEREST

The authors have declared that they have no conflict of interest to disclose.

## ETHICAL STANDARDS

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. The study was approved by all relevant agencies, including the Regional Medical Ethics Committee, the Norwegian Data Protection Agency, and the Norwegian Patient Register.

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## REFERENCES

- Barnicot, K., Katsakou, C., Bhatti, N., Savill, M., Fearn, N., & Priebe, S. (2012). Factors predicting the outcome of psychotherapy for borderline personality disorder: A systematic review. *Clinical Psychology Review*, 32(5), 400–412. <https://doi.org/10.1016/j.cpr.2012.04.004>
- Bindman, J., Johnson, S., Wright, S., Szmukler, G., Bebbington, P., Kuipers, E., & Thornicroft, G. (1997). Integration between primary and secondary services in the care of the severely mentally ill: Patients' and general practitioners' views. *British Journal of Psychiatry*, 171, 169–174. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9337955>
- Boyer, C. A., McAlpine, D. D., Pottick, K. J., & Olfson, M. (2000). Identifying risk factors and key strategies in linkage to outpatient psychiatric care. *American Journal of Psychiatry*, 157(10), 1592–1598. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11007712>
- Cohen, J. W. (1988). *Statistical power analysis for the behavioural sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Compton, M. T., Rudisch, B. E., Craw, J., Thompson, T., & Owens, D. A. (2006). Predictors of missed first appointments at community mental health centers after psychiatric hospitalization. *Psychiatric Services*, 57(4), 531–537. <https://doi.org/10.1176/appi.ps.57.4.531>
- Degnan, A., Seymour-Hyde, A., Harris, A., & Berry, K. (2016). The role of therapist attachment in alliance and outcome: A systematic literature review. *Clinical Psychology & Psychotherapy*, 23(1), 47–65.
- Durbin, J. G. P., Streiner, D. L., & Pink, G. (2006). Does systems integration affect continuity of mental health care? *Administration and Policy in Mental Health and Mental Health Services Research*, 33, 705–717.
- Farrell, S. P., Blank, M., Koch, J. R., Munjas, B., & Clement, D. G. (1999). Predicting whether patients receive continuity of care after discharge from state hospitals: Policy implications. *Archives of Psychiatric Nursing*, 13(6), 279–285. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/10618825>
- Fleury, M. J. (2005). Quebec mental health services networks: Models and implementation. *International Journal of Integrated Care*, 5, 07. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/16773157>
- Fleury, M. J., Bamvita, J. M., Farand, L., & Tremblay, J. (2008). Variables associated with general practitioners taking on patients with common mental disorders. *Mental Health in Family Medicine*, 5(3),



- 149–160. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/22477863>
- Fleury, M. J., Imboua, A., Aubé, D., & Farand, L. (2012a). Collaboration between general practitioners (GPs) and mental healthcare professionals within the context of reforms in Quebec. *Mental Health in Family Medicine*, 9(2), 77–90. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/23730332>
- Fleury, M. J., Imboua, A., Aube, D., Farand, L., & Lambert, Y. (2012b). General practitioners' management of mental disorders: A rewarding practice with considerable obstacles. *BMC Family Practice*, 13(1), 1–12.
- Forchuk, C., Reynolds, W., Sharkey, S., Martin, M. L., & Jensen, E. (2007). Transitional discharge based on therapeutic relationships: State of the art. *Archives of Psychiatric Nursing*, 21(2), 80–86. <https://doi.org/10.1016/j.apnu.2006.11.002>
- Goldberg, D., & Huxley P. (1980). *Mental illness in the community. The pathway to psychiatric care*. London, UK and New York, NY: Routledge.
- Greenberg, G. A., & Rosenheck, R. A. (2005). Continuity of care and clinical outcomes in a national health system. *Psychiatric Services*, 56(4), 427–433. <https://doi.org/10.1176/appi.ps.56.4.427>
- Green, C. A., Polen, M. R., LS, J., Caselton, K., Wisdom, J. P., Vuckovic, N., ... Oken, S. L. (2008). Understanding how client-patient relationships and relational continuity of care affect recovery from serious mental illness: STARS study results. *Psychiatric Rehabilitation Journal*, 32(1), 9–22.
- helfo.no. (2020). *Helfo*. Retrieved from <https://www.helfo.no/>
- Hoge, M. A., & Howenstine, R. A. (1997). Organizational development strategies for integrating mental health services. *Community Mental Health Journal*, 33(3), 175–187. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9211038>
- Jarman, B. (1983). Identification of underprivileged areas. *British Medical Journal*, 286(6379), 1705–1709. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/6405943>
- Lang, F. H., Johnstone, E. C., & Murray, G. D. (1997). Service provision for people with schizophrenia. II. Role of the general practitioner. *British Journal of Psychiatry*, 171, 165–168. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/9337954>
- Leighton, A. H. (1982). A recurrent millennium: The cure and prevention of mental illnesses. *Can Ment Health*, 30(2), 2–5. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/10298582>
- Littauer, H., Sexton, H., & Wynn, R. (2005). Qualities clients wish for in their therapists. *Scandinavian Journal of Caring Sciences*, 19(1), 28–31. <https://doi.org/10.1111/j.1471-6712.2005.00315.x>
- Myklebust, L. H., Olstad, R., Bjorbekkmo, S., Eisemann, M., Wynn, R., & Sorgaard, K. (2011). Impact on continuity of care of decentralized versus partly centralized mental health care in Northern Norway. *International Journal of Integrated Care*, 11, 142.
- Myklebust, L. H., Sorgaard, K., Bjorbekkmo, S., Nymann, A., Molvik, S., & Olstad, R. (2009). Bed utilization in two differently organized community mental health services in Northern Norway: The VELO-project. *Social Psychiatry and Psychiatric Epidemiology*, 44(7), 550–557. <https://doi.org/10.1007/s00127-008-0470-6>
- Myklebust, L. H., Sorgaard, K., Rotvold, K., & Wynn, R. (2012). Factors of importance to involuntary admission. *Nordic Journal of Psychiatry*, 66(3), 178–182. <https://doi.org/10.3109/08039488.2011.611252>
- Myklebust, L. H., Sorgaard, K., & Wynn, R. (2014). Local psychiatric beds appear to decrease the use of involuntary admission: A case-registry study. *BMC Health Services Research*, 14, 64. <https://doi.org/10.1186/1472-6963-14-64>
- Mykletun, A., Knudsen, A. K., Tangen, T., & Øverland, S. (2010). General practitioners' opinions on how to improve treatment of mental disorders in primary health care. Interviews with one hundred Norwegian general practitioners. *BMC Health Services Research*, 10(35).
- Newman, D., O'Reilly, P., Lee, S. H., & Kennedy, C. (2015). Mental health service users' experiences of mental health care: An integrative literature review. *Journal of Psychiatric and Mental Health Nursing*, 22(3), 171–182. <https://doi.org/10.1111/jpm.12202>
- Norwegian Parliament. (1999). *The regular general practitioner Scheme* Proposition no. 99 (1998–99) to the Norwegian Parliament.
- Omer, S., Priebe, S., & Giacco, D. (2015). Continuity across inpatient and outpatient mental health care or specialisation of teams? A systematic review. *European Psychiatry*, 30(2), 258–270.
- Reilly S, P. C., Hann, M., Reeves, D., Nazareth, I., & Lester, H. (2012). The role of primary care in service provision for people with severe mental illness in the United Kingdom. *PLoS One*, 7(5).
- Salvador-Carulla, L., Saldivia, S., Martinez-Leal, R., Vicente, B., Garcia-Alonso, C., Grandon, P., & Haro, J. M. (2008). Meso-level comparison of mental health service availability and use in Chile and Spain. *Psychiatric Services*, 59(4), 421–428. <https://doi.org/10.1176/appi.ps.59.4.421>
- Sørgaard, K. W., Nivison, M., Hansen, V., & Øiesvold, T. (2011). Acknowledging illness and treatment needs in first-time admitted psychiatric patients. *European Psychiatry*, 26(7), 446–451.
- ssb.no. (2016). *Doctors pr 10000 inhabitants*. Retrieved from <https://www.ssb.no/statbank/table/07793/tableViewLayout1/>
- Sundquist, K., Malmstrom, M., Johansson, S. E., & Sundquist, J. (2003). Care Need Index, a useful tool for the distribution of primary health care resources. *Journal of Epidemiology & Community Health*, 57(5), 347–352. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/12700218>
- The Directorate for Health and Social Affairs. (1999). *Opptappingsplanen for psykisk helse [The Plan on the escalation of psychiatric services]*. Oslo, Norway: The Directorate for Health and Social Affairs.
- The Directorate for Health and Social Affairs. (2006). *Distriktspsykiatriske sentra [District psychiatric centres]*. Oslo, Norway: The Directorate for Health and Social Affairs.
- Thorncroft, G., & Bebbington, P. (1989). Deinstitutionalisation--from hospital closure to service development. *British Journal of Psychiatry*, 155, 739–753. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/2695205>
- Thorncroft, G., & Tansella, M. (1999). *The mental health matrix : A manual to improve services*. Cambridge, UK and New York, NY: Cambridge University Press.
- Vazquez-Barquero, J. L., Diez-Manrique, J. F., Gaité, L., Iglesias Garcia, C., Artal, J., Roberts, S. E., & Wilkinson, G. (1992). Why people with probable minor psychiatric morbidity consult a doctor. *Psychological Medicine*, 22(2), 495–502. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/1615115>
- Verdoux, H. (2007). The current state of adult mental health care in France. *European Archives of Psychiatry and Clinical Neuroscience*, 257(2), 64–70. <https://doi.org/10.1007/s00406-006-0693-z>

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