

# Referral to Inpatient Treatment Does not Necessarily Imply a Need for Inpatient Treatment

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**Abstract** We analyzed the dispositional decisions taken in a unit for clinical decision making (UCDM) which was set up to examine all emergency inpatient referrals to a psychiatric hospital. Hospitalization proved unnecessary for at least 17 % of the  $N = 2,026$  inpatient referrals over a one year period. Instead, these patients were admitted to day-hospitals or outpatient treatments, resulting in annual cost savings of approximately €3.3 million. Merely 8 % of those non-admitted patients had to be hospitalized within 28 days of the decision for non-admission being taken. Thus, a specialized UCDM run by clinical experts can help identify cost-effective alternatives to hospitalization.

**Keywords** Psychiatric services · Emergency · Triage · Dispositional decision · Clinical decision making

## Introduction

Inpatient treatment is the most costly and restrictive component of psychiatric care, often representing a clinically disruptive event (Amaddeo et al. 2007; Jager et al. 2008; Stroul 1988). Whereas hospitalization may be desired by some patients, others perceive it as a traumatic and stigmatizing experience (Mattioni et al. 1999; Munizza et al. 1993).

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The *balanced care model* proposes treatment in the community (e.g. in outpatient clinics or day-hospitals) whenever possible and appropriate, although inpatient treatment remains an indispensable component of psychiatric service provision for those patients who cannot be treated in the community appropriately and safely. That is, the focus should be on service provision in community settings close to the population served in a balanced care model, with mental hospitals playing an important backup role which should be only used if really necessary (Thornicroft and Tansella 2003, 2004, 2009, 2013).

In line with the balanced care model, the ongoing mental health care reform aims to strengthen services in the community and to reduce the number of psychiatric hospital beds (Becker and Vazquez-Barquero 2001; Swiss Conference of Health Ministers 2008). However, even in many Western countries the implementation of comprehensive community care has not yet been fully accomplished (Amaddeo et al. 2007; Thornicroft et al. 2011). In particular, in Switzerland, the transfer from inpatient to community care is taking place more slowly than in neighboring European countries (Kuhl 2008; Swiss Conference of Health Ministers 2008). This lag is in stark contrast to research findings indicating that a substantial proportion of inpatients could be efficaciously treated in less restrictive and more economic community settings, such as e.g. day-hospitals (Marshall et al. 2001; Marshall et al. 2011; Wiersma et al. 1995) or mobile home-treatment/crisis-resolution teams (Berhe et al. 2005; Catty et al. 2002; Glover et al. 2006; Johnson et al. 2005).

Factors that facilitate the shift from inpatient to community care include sufficient capacity in community-based psychiatric services and monetary incentives that make community care no less attractive for institutions than inpatient care (Amaddeo et al. 2007; Blitz et al. 2001;

McGarvey et al. 2013; Talbott 2004). McGarvey et al. (2013) recently demonstrated that a lack of comprehensive community-based services increases the risk of involuntary hospitalization, whereas the availability of hospital beds have been shown to increase the probability of being hospitalized (Mattioni et al. 1999; Mulder et al. 2005).

In addition to these contextual or structural factors, another essential requirement for a successful shift from inpatient to community care is the reliable identification of patients who until now were treated in hospitals but for whom treatment in the community would also be suitable and possible. Several patient variables have been found to predict hospital admission; e.g., symptom severity, psychotic symptoms, dangerousness to self and others, suicide risk, alcohol and substance use, previous hospitalizations, inability to care for self, etc. (Blitz et al. 2001; Brooker et al. 2007; George et al. 2002; Marson et al. 1988; Mattioni et al. 1999; McNiel et al. 1992; Olfson et al. 2011; Way 2005; Way et al. 1992; Ziegenbein et al. 2006). These variables and multivariate prediction models and decision support tools based thereupon (Lyons et al. 1997; McGarvey et al. 2013; Mulder et al. 2005; Rabinowitz et al. 1995; Way and Banks 2001) may support level of care decisions in psychiatric emergency settings and hence may be helpful to prevent dispositional decisions for unnecessary hospitalizations.

Beyond the characteristics of the patient, the qualifications and the experience of the admitting staff in psychiatric emergency rooms were shown to be other important determinants of level of care decisions, with more experienced and more qualified clinicians being more likely to recommend a treatment other than hospitalization (Fichtner and Flaherty 1993; Flaherty and Fichtner 1992; Rabinowitz et al. 1995; Sattar et al. 2006), probably because they feel more confident than less experienced clinicians in recommending cost-effective treatment alternatives to hospitalization (Blitz et al. 2001).

Specialized psychiatric emergency services and triage sites for level of care decisions are an important component in comprehensive mental health care systems that emphasize a shift from hospital to community-based care. Given this critical role of triage sites as a gatekeeper to inpatient care, since July 2010, the Psychiatric Services Aargau (PDAG) in Switzerland operate a central unit for clinical decision making (UCDM) with a highly experienced expert staff to examine all emergency referrals to inpatient wards. The PDAG are legally bound to provide primary mental health care to the population of one of the largest service provision areas in Switzerland (620,000 inhabitants). This means the hospital of the PDAG provides the vast majority (78 %) of psychiatric inpatient days within that service provision area. In addition to the psychiatric hospital (160 beds in acute wards, exclusive of geronto-psychiatric wards

for patients >65 years), the PDAG run 4 outpatient clinics and 3 day-hospitals (offering 42 treatment places). These treatment facilities are all located in the larger communities of the psychiatric catchment area.

During the opening hours of the UCDM (weekdays: 8 a.m.–12 p.m. and 1 p.m.–5 p.m.) all psychiatric emergencies referred to the PDAG for inpatient treatment are examined by the UCDM's highly experienced staff (around the clock service was not possible in this pilot period due to budget restrictions and the resulting staff shortages). The UCDM is accommodated in the hospital of the PDAG, which is located in the center of the service provision area. Following a psychiatric examination by the UCDM staff (psychiatrists, clinical psychologists, and nurses), patients are referred to either inpatient wards, day-hospitals, outpatient treatments (outpatient clinics of the PDAG, psychiatrists in private practice, general practitioners, etc.) or to counseling services, whatever appears to be most appropriate from a clinical perspective. The aim of the UCDM's triage process is to organize optimal mental health care for each individual patient. Admission to an inpatient ward should occur only if hospitalization is deemed necessary by an experienced clinician; day or outpatient treatment should be given preference whenever feasible. The rationale behind this procedure was the prevention of further overcrowding of the psychiatric hospital, a reduction in treatment costs and an increase in the quality of mental health care.

The decision process in the UCDM encompassed two steps:

- 1 A primary decision was taken when the patient or the authority referring him/her, initially telephoned the hospital. Only where there was any question about the patient's need for inpatient treatment were they invited for an examination in the UCDM. Patients in obvious need of inpatient treatment (e.g. patients referred for compulsory hospitalization or patients presenting a risk to themselves or to others) were admitted directly to inpatient wards. Less severe cases that obviously did not require immediate inpatient treatment were referred to outpatient or counseling services.
- 2 For those patients actually seen in the UCDM, a secondary decision was made following a psychiatric examination by UCDM staff. The aim was to organize and initiate the most appropriate treatment (inpatient, outpatient or day-treatment) for each individual patient. In some cases the UCDM staff offered temporary outpatient treatment until the desired treatment was available (e.g. in a specialized ward of the hospital) or until there was no need for further treatment.

It is important to note that there were no formal clinical criteria (e.g., diagnosis of schizophrenia) that

determined treatment in a particular setting (e.g., inpatient treatment). The patient characteristics shown to be predictive of inpatient admission in previous studies (e.g. suicide risk) were of course considered by the experienced UCDM staff and influenced their level of care decision, but there were no formal and standardized assessment and decision making procedures. The decision for the most appropriate treatment setting finally relied on the clinical expertise of the highly experienced UCDM staff. The reasons to desist from the use of multivariate decision support tools to make dispositional decisions were twofold: On the one hand the assessment and documentation of (psychometric) information would have been too time-consuming in our routine clinical setting and hence was not feasible with our very limited resources. On the other hand, although being able to make rather good predictions of dispositional decisions, the current multivariate decision support tools still are not perfectly accurate (the percentage of correctly predicted cases typically ranges between 75 and 85 %; Lyons et al. 1997; Marson et al. 1988; McGarvey et al. 2013; Rabinowitz et al. 1995; Way and Banks 2001). Correspondingly, to our knowledge, there still are no guidelines or recommendations concerning the indication for inpatient psychiatric admission (Ziegenbein et al. 2006). Thus, even if decision support tools would have been applied, their recommendations must not have been mandatory for admitting clinicians for safety reasons.

This study aimed to examine the effects of the implementation of the UCDM by posing the following research questions:

1. Which patients are seen in the UCDM; which are admitted directly to inpatient wards?
2. Is it possible to reduce admissions to inpatient wards among patients referred for inpatient treatment by operating a central UCDM with an expert staff?
3. Is the substitution of inpatient care by treatments in less restrictive settings (outpatient, day-hospitals) sustainable? That is, are the UCDM decisions for non-admission to inpatient wards valid for at least 4 weeks?
4. Are the costs of operating the UCDM outbalanced by the savings due to non-admissions to costly inpatient treatments?

## Methods

We used the medical database of the PDAG to evaluate the benefits of the UCDM and its effects on admissions to inpatient wards between November 2010 and October

2011. Our analyses were restricted to the departments of general psychiatry and substance use disorders since the admissions to the geronto-psychiatric, forensic and rehabilitative wards were not usually seen in the UCDM but admitted directly to the specialized inpatient wards.

Configural frequency analysis (CFA; von Eye et al. 1996) was used to examine associations between main diagnoses (according to the ICD-10) and decisions for treatment settings (e.g., outpatient treatment). CFA enabled us to check in crosstabs whether a certain cell (configuration; e.g., inpatient treatment in the case of schizophrenia) was significantly more or less frequent than expected by chance (i.e., assuming independence between diagnosis and treatment decision). In CFA there is a  $\chi^2$ -test for every cell of the crosstab; we used Bonferroni-correction to control for type I error inflation.

Subsequently, we analyzed the number of admissions to inpatient wards of the PDAG over the past 5 years (January 2007 to December 2011). We used linear regression models to identify trends in the periods preceding and following the opening of the central UCDM.

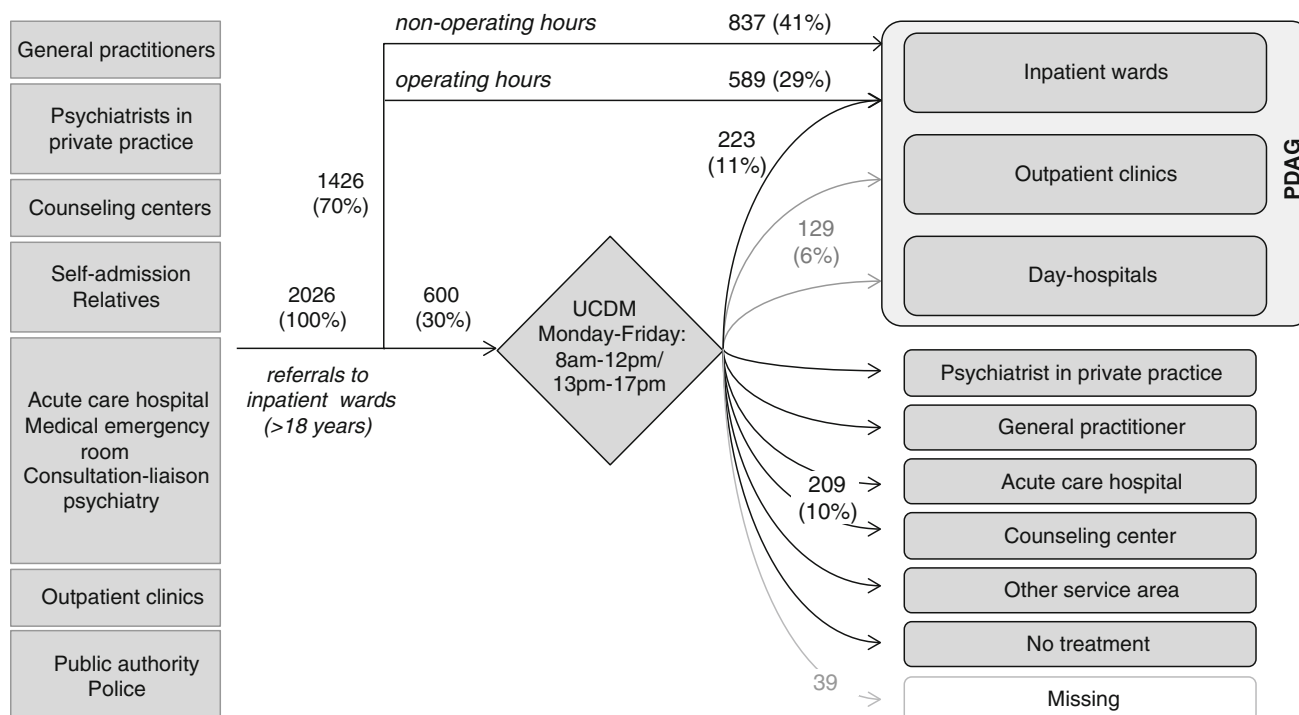
Finally, the costs of the UCDM and its benefits were estimated and compared.

## Results

### Which Patients are Seen in the UCDM and Which are Admitted Directly to Inpatient Wards?

There were  $N = 2,026$  referrals to inpatient treatment between November 2010 and October 2011. 837 (41 %) of these referrals happened outside the opening hours of the UCDM. These patients were admitted directly to inpatient wards (with no UCDM examination). Of the remaining referrals during opening hours, 600 (30 %) were seen by UCDM staff and 589 (29 %) were hospitalized (with no UCDM examination) based on details given during the initial telephone call announcing the patient's arrival (Fig. 1).

The majority of the 589 patients who were admitted directly to inpatient wards did not belong to the target group of the UCDM according to its operational concept: 325 (55 %) were elective (non-emergency) admissions (e.g., for voluntary inpatient substance withdrawal) and 91 (15 %) were compulsory hospitalizations (e.g. due to highly violent behavior). The remaining 173 (29 %) cases hospitalized during opening hours with no UCDM examination were in obvious need of inpatient treatment according to the details given during the initial telephone call announcing the patient's arrival (e.g., referrals from professionals of the outpatient clinics of the PDAG).



**Fig. 1** Referrals to inpatient wards. *Note* UCDM = Unit for clinical decision making

### Is it Possible to Reduce Hospital Admissions Among Patients Referred to Inpatient Treatment by Means of a Central UCDM?

Based on the psychiatric examination in the UCDM, hospitalization proved unnecessary in 338 (17 %) of the  $N = 2,026$  patients who were referred to inpatient treatment. For these patients the UCDM staff organized an outpatient or day-treatment in the PDAG (6 %) or a treatment outside the PDAG (10 %), instead (Fig. 1). Where only the referrals to the psychiatric hospital during the opening hours of the UCDM are taken into account, the number of patients who were not admitted to inpatient wards after an UCDM examination increased to 29 % (Table 1). Finally, of those patients who were actually seen in the UCDM (i.e. disregarding those cases where a decision regarding treatment had already been taken on the telephone), 60 % were not allocated to inpatient wards: 23 % were referred to outpatient or day-treatment services of the PDAG and 37 % were referred to a treatment outside the PDAG (Fig. 2).

Table 1 presents the decisions of the UCDM staff regarding the treatment setting depending on the primary diagnoses (ICD-10). The left half contains the 600 referrals to inpatient wards who had actually been seen in the UCDM. The right half also includes those patients who were hospitalized directly, i.e. without a UCDM examination, during UCDM opening hours. Patients with organic mental disorders (F0) were rarely seen by the UCDM staff

(please note that geronto-psychiatric patients >65 years were referred directly to inpatient wards and not considered in our analyses). The frequency of hospitalization of patients with substance use disorders (F1) was disproportionate; as a result they were relatively rarely referred to other treatment settings. Furthermore, in those cases with a UCDM examination (left half of Table 1), there were several tendencies which did not reach statistical significance after Bonferroni-correction of type I error ( $\alpha = 0.05/24 = 0.00208$ ). Patients with affective disorders (F3) tended to be referred disproportionately often to outpatient or day-treatment services of the PDAG. Patients with neurotic, stress-related and somatoform disorders (F4) were referred relatively often to treatments outside the PDAG (e.g., to psychiatrists in private practice).

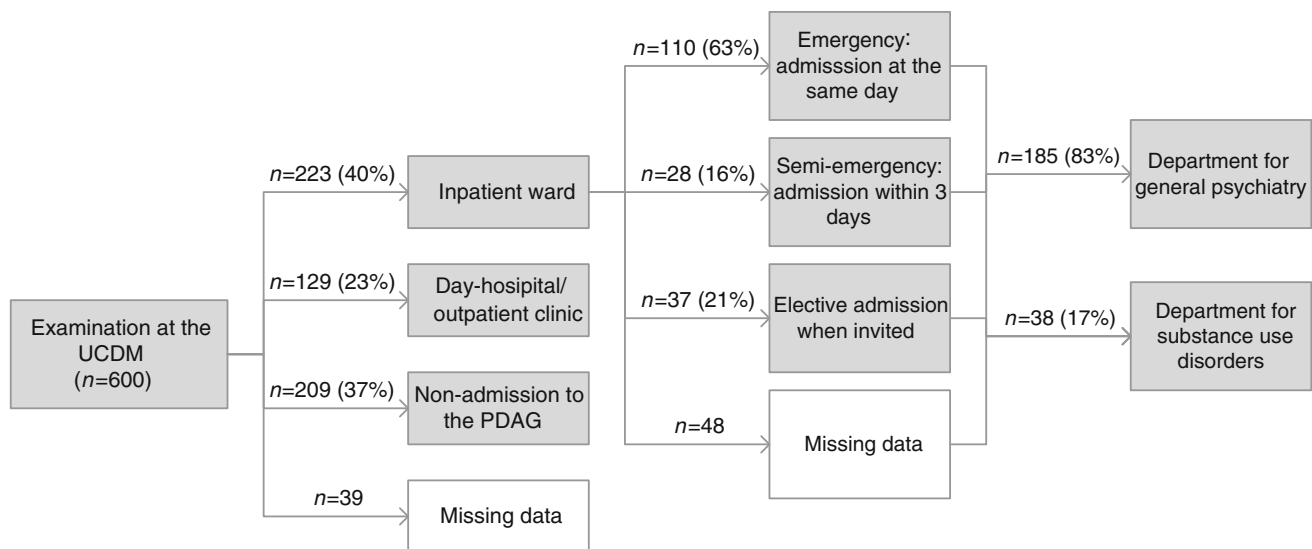
In 37 % of the emergencies resulting in hospitalization following a UCDM examination, admission to an inpatient ward could at least be postponed to a later date (Fig. 2) and time was gained to organize a bed in the best suited (disorder-specific) ward. In patients with substance use disorders (F1), who were disproportionately often hospitalized after a UCDM examination, the number of postponed inpatient admissions was particularly high (55 %).

Figure 3 shows the number of inpatient admissions per quarter during the past 5 years (general psychiatry and substance use disorders departments only). Commencing 2007, the number of hospitalizations followed an ever increasing trend until the opening of the UCDM in July

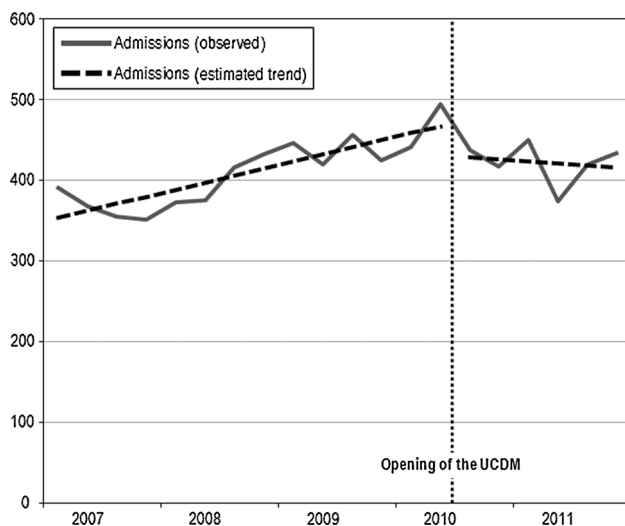
**Table 1** Dispositional decisions taken during the opening hours of the unit for clinical decision making (UCDM), depending on primary diagnoses (ICD-10)

| Primary diagnosis (ICD-10)   | Cases with UCDM examination: dispositional decision |                                   |                          |         | All cases (inclusive of those directly admitted without UCDM examination): dispositional decision |                                   |                          |         |
|--|---|-----------------------------------|--------------------------|---------|---|-----------------------------------|--------------------------|---------|
|  | Inpatient ward                                      | day-hospital or outpatient clinic | No admission to the PDAG | Missing | Inpatient ward  | Day-hospital or outpatient clinic | No admission to the PDAG | Missing |
| Organic, including symptomatic, mental disorders (F0)                  | 1 (33 %)  | 1 (33 %)                          | 1 (33 %)                 | 1       | 13 (87 %)   | 1 (7 %)                           | 1 (7 %)                  | 1       |
| Mental and behavioral disorders due to psychoactive substance use (F1) | <b>47 (63 %)**</b>                                  | 8 (11 %)*                         | 20 (27 %)                | 6       | <b>292 (91 %)***</b>  | <b>8 (3 %)***</b>                 | <b>20 (6 %)***</b>       | 6       |
| Schizophrenia, schizotypal and delusional disorders (F2)               | 41 (45 %)   | 21 (23 %)                         | 29 (32 %)                | 5       | 139 (74 %)  | 21 (11 %)                         | 29 (15 %)                | 5       |
| Mood (affective) disorders (F3)  | 72 (36 %)   | 60 (30 %)*                        | 69 (34 %)                | 14      | 203 (61 %)*   | <b>60 (18 %)***</b>               | 69 (21 %)                | 14      |
| Neurotic, stress-related and somatoform disorders (F4)                 | 40 (31 %)   | 25 (19 %)                         | 66 (50 %)*               | 4       | <b>90 (50 %)***</b>   | 25 (14 %)                         | <b>66 (37 %)***</b>      | 4       |
| Disorders of adult personality and behavior (F6)                       | 17 (50 %)   | 9 (27 %)                          | 8 (23 %)                 | 7       | 38 (69 %)   | 9 (16 %)                          | 8 (16 %)                 | 7       |
| Other mental or behavioral disorders                                   | 4 (22 %)  | 5 (28 %)                          | 9 (50 %)                 | 1       | 13 (48 %)   | 5 (19 %)                          | 9 (33 %)                 | 1       |
| None/missing   | 1 (12 %)  | 0                                 | 7 (88 %)*                | 1       | 24 (77 %)   | 0 (0 %)*                          | 7 (23 %)                 | 1       |
| Total  | 223 (40 %)  | 129 (23 %)                        | 209 (37 %)               | 39      | 812 (71 %)  | 129 (11 %)                        | 209 (18 %)               | 39      |

Configural frequency analysis. \*\*\*  $p < 0.001$ , \*\*  $p < .01$ , \*  $p < 0.05$ ; statistically significant over- or under-represented configurations (cells) after Bonferroni-correction are boldface



**Fig. 2** Dispositional decisions at the unit for clinical decision making (UCDM)



**Fig. 3** Admissions to inpatient wards (general psychiatry and substance use disorders) 2007–2011

2010 ( $B = 8.75$ ;  $SE = 1.51$ ; 95 % CI 5.79–11.71;  $p < 0.001$ ). Following the opening of the UCDM, a negative trend set in ( $B = -2.49$ ;  $SE = 6.92$ ; 95 % CI -16.05 to 11.07;  $p = 0.74$ ). At the very least, the steadily increasing number of inpatient admissions was halted by the launching of the central UCDM.

Is the Substitution of Inpatient Treatments by Treatments in Less Restrictive Settings (Outpatient, Day-Hospitals) Sustainable?

Only 28 (8 %) of the 338 cases who were not admitted to inpatient wards after a UCDM examination had to be hospitalized in the PDAG within 4 weeks of the UCDM

examination. For the remaining 310 (92 %) of the cases, non-admission to inpatient wards proved to be a sustainable treatment decision for at least 4 weeks. The readmission rates within 7, 14, and 21 days were 4, 7, and 8 %, respectively.

Cost-Benefit Analysis: Are the Costs of Operating the UCDM Outbalanced by the Savings due to Non-Admissions to Costly Inpatient Treatments?

The 310 UCDM decisions for non-admission that turned out to be sustainable for at least 28 days resulted in cost savings of approximately €4.7 million. This estimation was based on the direct costs of €542 (CHF 650) per inpatient day and on the assumption of an average treatment length of 28 days in the hospital of the PDAG ( $310 * 542 * 28 = 4,704,560$ ).

The 338 patients who were not hospitalized following UCDM examination were referred to either day-hospitals ( $n = 65$ ) or outpatient care ( $n = 273$ ). The direct costs for alternative day treatment were estimated to equal approximately €630,000, based on direct costs of €325 (CHF 390) per day in partial hospitalization and on an average treatment length of 30 days ( $65 * 325 * 30 = 633,750$ ). Those 273 cases who were referred to outpatient treatment (either in an outpatient clinic of the PDAG or at a physician in private practice) ran up an estimated bill of approximately €350,000. This amount was estimated assuming an intensive outpatient treatment with 8 h of consultation during the first 4 weeks after non-admission (instead of inpatient treatment with an average length of 28 days) and direct costs of €159 (CHF 191) per hour ( $273 * 8 * 159 = 347,256$ ). (Note that the 28 patients who had to be



hospitalized within 28 days of the UCDM decision for non-admission being taken were treated in the above calculations as if they would have generated costs in both the hospital and the community setting at the same time to get the most conservative estimation of the cost savings due to the UCDM.)

The personnel and overhead costs for the operation of the UCDM equaled approximately €390,000 per year. Subtracting these operation costs and the direct costs for alternative treatments to hospitalization ( $633,750 + 347,256 = 981,006$ ) from the cost savings due to non-hospitalizations (4,704,560), the implementation of the UCDM resulted in estimated overall cost savings of approximately €3.3 million per year ( $4,704,560 - 390,000 - 981,006 = 3,333,554$ ).

## Discussion

This study demonstrated that referrals to psychiatric hospitals do not necessarily imply a need for inpatient treatment. The provision of a central UCDM, i.e. a central triage site for level of care decisions, staffed by highly experienced clinicians to examine all emergency patients referred to a psychiatric hospital may effectively reduce the number of hospitalizations. In our study, hospitalization proved unnecessary in at least 17 % of the referrals for inpatient treatment. These patients were allocated to day or outpatient treatment instead. Most of the UCDM decisions for non-admission proved to be sustainable even in the long term. Only a few (8 %) of the patients who were not referred to inpatient wards by the UCDM staff had to be hospitalized within 4 weeks of the UCDM's decision for non-admission. As a result, the steady increase in the number of admissions to the hospital of the PDAG over the past years (reflecting a nationwide trend in Switzerland; cf. Kuhl 2008), was successfully halted by the implementation of the central UCDM, resulting in cost savings of approximately €3.3 million per year.

The largest potential for substituting inpatient care was found in patients with neurotic and somatoform disorders (ICD-10: F4). In 69 % of these patients who were seen by the UCDM staff, day or outpatient treatment proved to be possible and appropriate. Although the large potential for substituting inpatient care in patients with F4 disorders is in line with previous findings (Mattioni et al. 1999), caution is warranted when generalizing the potential of the UCDM to avoid unnecessary admissions to mental health care systems in other countries. While the proportion of F4 patients referred to the PDAG for inpatient treatment was almost identical to the proportion of F4 patients in Swiss mental hospitals (16.1 vs. 16.2 %; Ruesch et al. 2013) and furthermore similar to the figures reported for Australia (Low and

Draper 2009), the proportion of F4 diagnoses might be lower in other countries where presentations with other and more severe mental disorders (e.g. schizophrenia or bipolar disorders) are relatively more frequent (Preti et al. 2009). However, except for substance use disorders (F1: 38 % non-admissions), the UCDM staff was able to initiate day or outpatient treatment for the majority of the patients examined in all other diagnostic groups (F2: 55 % non-admissions; F3: 64 %; F6: 50 %; other diagnoses: 78 %). The lack of a specialized day-hospital for substance use disorders in the PDAG might be a reason for the relatively high rate of inpatient admissions in patients with substance use disorders (all day-hospitals of the PDAG have a focus on general psychiatry). The frequent substitution of inpatient treatments in the remaining diagnostic groups is in line with some previous findings suggesting that decisions for inpatient admissions depend on the coping abilities of patients rather than on their diagnoses (Schnyder et al. 1995). While patients with substance use disorders were admitted to inpatient wards relatively often (McGarvey et al. 2013; Olfson et al. 2011), their hospitalization could, in many cases (55 %), be postponed to a later date by the UCDM staff. Time was gained to organize a bed in the most suitable inpatient ward. Patients with substance use disorders seem to be a particular group in yet another way: the proportion of patients who were not seen by the UCDM staff but admitted directly to inpatient wards was the highest in F1 patients. This may be explained by the fact that many of them came for elective substance withdrawal and thus were admitted directly to inpatient wards without a UCDM examination.

Our findings suggesting that a considerable proportion of the emergencies referred to psychiatric hospitals for inpatient treatment may be effectively treated in less restrictive and more economic, day-hospital or outpatient settings are in accordance with the findings of some previous studies (Marshall et al. 2001, 2011; Wiersma et al. 1995). Research has shown that the decision whether or not to hospitalize patients depends not only upon clinical characteristics (e.g., symptom severity) but also on factors such as the availability of beds, preferences of relatives or accompanying individuals, and the expertise of the medical staff (Blitz et al. 2001; Douglass et al. 2011; Fichtner and Flaherty 1993; Flaherty and Fichtner 1992; Mattioni et al. 1999; Mulder et al. 2005; Rabinowitz et al. 1995; Sattar et al. 2006; Way 2005; Ziegenbein et al. 2006).

The finding of reduced hospitalizations following the provision of the UCDM calls for particular attention when bearing in mind that, due to budget restrictions and the resulting staff shortages, patients were seen in the UCDM on weekdays and during business hours (8 a.m.–12 p.m. and 1 p.m.–5 p.m.) only. This resulted in many patients being admitted directly to inpatient wards without a UCDM examination. With an extension of the UCDM's

opening hours (ideally 24/7) one might expect the number of non-admissions to increase further, though a linear extrapolation (generalization) of our findings to nights and weekends might not be warranted since our study sample might not be representative of the emergency patient population referred to inpatient treatments at nights and on weekends (Blitz et al. 2001). For instance, Mulder et al. (2005) found that involuntary admission was associated with referral after working hours. However, the full potential of the UCDM regarding the substitution of inpatient treatment might be underestimated for yet another reason: during the study period the 3 day-hospitals of the PDAG were almost permanently used to capacity; they were often massively overcrowded. In some cases the substitution of inpatient treatment may have been hindered by the limited capacity of day-hospitals. This underscores the importance of sufficient capacity in community-based services to strengthen the shift from inpatient to community-based care (Amaddeo et al. 2007; Blitz et al. 2001; McGarvey et al. 2013; Talbott 2004). Yet another factor that may hinder the promotion of treatment in the community is the monetary incentive which, at least in Switzerland, still makes inpatient treatment more attractive for mental health institutions than day or outpatient treatment. Although our findings suggest a transfer of funds from the inpatient to the community setting, this is hindered by financial plans that in Switzerland strictly discriminate between inpatient and community care. Unlike the costs of inpatient care, the costs of day hospitals and of institutional outpatient care are often not fully covered by public authorities and health insurances. Treating patients in the community setting thus is commonly loss making for community-based psychiatric services in Switzerland. If these structural issues were addressed by Swiss policy makers, then the provision of a UCDM to see all emergency referrals to inpatient treatments might not only relieve inpatient wards of costly hospital admissions but also increase the quality of mental health care by initiating the optimal treatment for each individual patient. The strengthening of an integrated mental health care approach by the UCDM might add to patient satisfaction with mental health services (Berhe et al. 2005; Johnson et al. 2005).

Nevertheless, inpatient treatment remains an indispensable component of psychiatric service provision in a “balanced care” model (Thorncroft and Tansella, 2003, 2004, 2009, 2013). Whilst a central UCDM may reduce the number of inpatient admissions, it also leads to a selection of the most “difficult” patients in the inpatient wards. This should be considered when allocating the treatment resources to different settings.

Several limitations of this study have to be addressed. Probably the most important limitation concerns the lack of a control group. We do not know what would have

happened to patients if they had not been seen by the UCDM staff during the study period. However, before the opening of the UCDM, all emergencies referred to the hospital for inpatient treatment were seen by resident physicians of the PDAG and then admitted directly to inpatient wards. Thus, the reduction in hospital admissions can be seen to be a direct result of the UCDM.

A second limitation of this study concerns the unknown number of referrals to inpatient treatments that were allocated to other treatment settings during initial contact on the telephone, i.e., without an examination of the patient in the UCDM. Data on these patients were not available because the assessment and documentation of telephone calls was not feasible in the UCDM due to the strictly limited personnel resources. However, this omission resulted in an underestimation of the full potential of the UCDM and represents a conservative bias of our study findings with respect to the reduction in hospital admissions.

Thirdly, we do not have data on adverse outcomes (e.g. suicides or episodes of self-harm) for those patients not admitted. These data from other sources are not available in Switzerland due to very strict data protection laws. To examine adverse consequences of non-admissions and to explore the impact of the UCDM on service quality in general (including patients’ satisfaction and further clinical outcomes such as severity of the problem, level of psychosocial functioning or quality of life) should be an important task for future research (Blitz et al. 2001).

A fourth limitation concerns the diagnostic information used in this study. As is usual in services research, diagnoses were not assessed with structured clinical interviews such as the SCID-I (First, Spitzer, et al. 1997b) and SCID-II (First, Gibbon, et al. 1997a). Their application would have been far too time-consuming for a routine clinical care setting. Concerning the reliability of our clinical diagnoses, however, miss-codings might be rare as we only analyzed broad diagnostic categories (ICD-10: F0, F1, F2 etc.).

Finally, there were no explicit algorithms to prescribe and support the decision process of the UCDM staff. Whether or not to hospitalize a patient relied fully on the clinical expertise of the UCDM staff. Such lack of formal clinical criteria that determined treatment in a particular setting (e.g., inpatient treatment) might be seen to limit the usability of this study since it gives little guidance on how to make clinical decisions to achieve the results observed. However, there are no guidelines or recommendations concerning the indication for inpatient psychiatric admission (Way and Banks 2001; Ziegenbein et al. 2006). Research has shown that very few characteristics reliably predict the need for inpatient treatment and even the reliability of multivariate decision support tools seems to be



limited (Lyons et al. 1997; Marson et al. 1988; McGarvey et al. 2013; Rabinowitz et al. 1995; Way and Banks 2001). Thus, full reliance on such decision support tools would not have been feasible for safety reasons. Against this background, we aimed to examine the potential of clinical decisions based on the expertise of an experienced UCDM staff as they happen under routine clinical conditions. Except for diagnostic information, we did not examine whether there are certain characteristics that are particularly well suited to discriminate between patients in need of inpatient treatment and their counterparts for whom day or outpatient treatment proved to be sufficient. The assessment and investigation of such characteristics should be the topic of further research, and may support the development of guidelines to optimize the decision process in specialized UCDM of psychiatric hospitals.

**Conflict of interests** None.

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