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Abstract

Background: Readmission rates are under growing scrutiny as an indicator of quality of care as much as a potential source of savings. Patients with comorbid psychiatric conditions are more likely to be readmitted, so Consultation-Liaison Psychiatry (CLP) may play a role in lowering readmission rates.

Method: In this retrospective cohort study conducted in a general hospital in Paris, France, all consecutive adult inpatients referred for the first time to CLP from January 2008 to December 2016, were included. The main outcomes were 30-day and 7-day readmissions in the same hospital, excluding iterative and planned stays. The objective of this study is to determine whether the timing of psychiatric consultations is associated with 30-day and 7-day readmission rates.

Results: A total of 4498 inpatients (2298(51·1%) women, age=59·8(±19·3) years) were referred to CLP. Adjusting for age, sex, place of residence, year of admission, type of ward, psychiatric diagnosis and disease severity, later consultation was associated with higher 30-day and 7-day readmission rates (adjusted Odds Ratio [95% confidence interval]:1.21[1·10-1·33] and 1·26[1·11-3·13], respectively). Further adjusting for length of stay, the association remained significant for 7-day readmission (1.28[1·05-1·57]). After stratification on the length of stay, for stays in the highest tercile (i.e., >21 days) an intervention after day 3 (versus before) was associated with 30-day and 7-day readmission rates of 15·8% versus 8·6%(1·81 [1·11-3·13]) and 4·9% versus 1·8%(2·98[1·16-9·88]), respectively.

Conclusion: Earlier psychiatric consultation was associated with fewer 30-day and 7-day readmissions. Interventional studies are needed to show that proactive CLP teams could help general hospitals to improve quality of care and make significant economic savings.

Keywords: Psychosomatics, Consultation-Liaison Psychiatry, Psychiatric comorbidity, Quality of care, Medicoeconomics, Hospital readmission

Introduction

Over the past decade, hospital readmission has become a major issue in health policies, as an indicator for both quality of care and a source of economic savings (1). After an index hospital admission for a physical condition, patients with a comorbid psychiatric condition are more likely to be readmitted in a general hospital than those without (2,3). In addition, medical-psychiatric comorbidity is related to increased length of stay, medical costs and rehospitalization(4). The prevalence of such psychiatric comorbidity among general hospital inpatients ranges from 26 to 39 % (5,6). In this population, in addition to specific needs regarding mental health, a poorer quality of care has been suggested in terms of prevention, screening, diagnosis, treatment and follow-up of physical diseases (7–9). One of the main missions of consultation-liaison (C-L) psychiatry is to improve the global care of this specific population.

Since 2010 in the United States, the Hospital Readmission Reduction Program established financial penalties for hospitals with higher-than-expected readmission rates (10). Since then, many studies have tried to identify factors that could lower patients' risk of readmission. To our knowledge, none of these studies have led to recommendations concerning C-L psychiatry (11–13). Since C-L psychiatry interventions have demonstrated a positive impact on both cost and quality of care (14,15), they may also reduce the risk of hospital readmission.

A study carried out at European Georges-Pompidou Hospital (Paris, France) involving 4500 consecutive inpatients found that earlier psychiatric consultation was associated with shorter lengths of stays (16). This study emphasized the importance of C-L psychiatry from a medico-economic perspective. However, reducing the length of stay should not be the sole target, especially if it leads to poorer quality of care and higher rate of readmission. In fact, some studies suggest that a decrease in length of stay is associated with an increased readmission rate (17).

The primary aim of this study was to examine the association between the timeliness of the psychiatric consultation and the rates of 30-day and 7-day unplanned readmission among the same population as the one recruited in the previous study. Our hypothesis was that earlier psychiatric consultations are associated with lower readmission rates. Should this association be significant, our secondary aim was to examine whether it is independent from the length of stay, assumed to be a potential confounder or an effect modifier.

Methods

Participants

The study was conducted at European Georges-Pompidou Hospital (Paris, France), a 712-bed university general hospital in Paris, France. In this hospital, patients are referred to C-L psychiatrists by the patient's treating doctor. After a first evaluation, the psychiatrist establishes a treatment proposal that he or she will present to both the referring doctor and the patient. The C-L psychiatrist can, if needed, see the patient multiple times during his or her stay, after the discharge or during later hospital stays.

All consecutive inpatients referred for the first time to a C-L psychiatrist from January 1st, 2008 to December 31, 2016, were included in the study. Subsequent admissions with a psychiatric consultation were not considered if a first psychiatric consultation took place during a previous stay.

Eligibility criteria were:

- being aged 18 or more,
- living in France,
- having a main psychiatric diagnosis, assessed using the codes F0, F1, F2, F3, F4, F5 or F6 according to the 10th version of the International Classification of Diseases, as recorded by the psychiatrist during the hospitalization (F0: "Organic, including symptomatic, mental disorders"; F1: "Mental and behavioral disorders due to psychoactive substance use"; F2: Schizophrenia, schizotypal and delusional disorders"; F3: "Mood disorders"; F4: "Neurotic, stress-related and somatoform disorders"; F5: "Behavioral syndromes associated with physiological disturbances and physical factors"; F6: "Disorders of adult personality and behavior"),
- and having no missing data for selected variables.

Exclusion criteria included a length of stay <2 days, patients deceased during the index stay or a psychiatric consultation the day of admission. In line with our previous study on length of stay[16], patients with a psychiatric consultation the day of admission were not included because these referrals were likely to concern patients whose psychiatric condition is more serious than their physical condition (e.g., a suicide attempt without serious physical consequences allowing a rapid psychiatric assessment). These situations are often associated with rapid hospital discharges, including transfers to psychiatric ward, and could thus have led to overestimating the association between a shorter timing of psychiatric consultation and a lower probability of early readmission in general hospital.

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.

Data collection

Data were obtained from the computerized medical records of the European Georges-Pompidou Hospital. Collected data included age, sex, admission date, discharge date, date of the first psychiatric consultation, place of residence, type of ward, diagnostic category of primary psychiatric diagnosis, diagnostic category of primary non-psychiatric diagnosis and disease severity. If the patient had been readmitted to the European Georges-Pompidou Hospital within 30 days of discharge from the index hospitalization, we also collected the dates of admission and discharge and the type of ward of the second stay.

The number of days prior to the psychiatric consultation was calculated as the whole number of days from the admission to the first psychiatric consultation. Year of admission was derived from the date of admission and categorized into three classes: 2008-2010, 2011-2013 and 2014-2016. Place of residence was dichotomized into: patients who lived in the area near the hospital (in the 15th administrative district of Paris, about 1.5-mile radius from the hospital) and patients who lived

elsewhere in France. Type of ward was considered as the place where the patient was hospitalized at the time of the psychiatric consultation and categorized into : medical, surgery or intensive care unit. We used the "Groupe Homogène de Séjour" (GHS), a French version of the Diagnosis-related group (DRG)-based fee, as a proxy of the disease severity. GHS were extracted from the annual national databases for public health facilities.

Definition of unplanned hospital readmission

Unplanned hospital readmission was defined as any new hospital stay in the European Georges-Pompidou Hospital, within 30 days after the initial discharge date and for which the length of stay was above one day. We did not consider as unplanned readmissions stays related to planned or iterative care as described by the French Ministry of Health in its methodological guide for the calculation of the 30-day readmission rate (18) (e.g., dialyses, chemotherapy, organ transplant follow-up). This definition is concurring with the one used in the United States in the Hospital Readmission Reduction Program (19).

Statistical analysis

Statistical analysis was performed with the R Statistics software (http://cran.r-project.org, version 1.1.456).

Our aim was to investigate the associations between the timing of psychiatric consultation and the risk of 30-day and 7-day readmission. Since the timing of psychiatric consultation was positively skewed, we first applied a logarithmic transformation to it (16).

Preliminary analyses were performed to identify variables associated with 30-day and 7-day readmission. To this aim, we divided the population in two groups, readmitted or not, and compared their characteristics using Chi^2 and t tests according to the type of the variable. Then, we assessed the association between readmission and each variable (i.e. timing of consultation, age, sex, year of

admission, place of residence, type of ward, main psychiatric diagnosis, disease severity and length of stay) using nine univariate logistic regressions. These variables were selected a priori based on existing literature on the risk factors of early readmission (20–22).

We then studied the association between the timing of psychiatric consultation for both outcomes (i.e. 30-day and 7-day readmission), adjusting for all the other variables in three multivariate logistic regression models. Model 1 included only age and sex as covariates. Model 2 further included all the covariates except length of stay (i.e., year of admission, place of residence, type of ward, main psychiatric diagnosis, disease severity). Regarding the main psychiatric diagnosis, F4 (i.e., "Neurotic, stress-related and somatoform disorders") was the most frequent and thus used as the reference category. Model 3 further included length of stay. Since the length of stay was positively skewed, we first applied a logarithmic transformation to it.

Next, according to our secondary aim, we further explored whether any association between the timing of psychiatric consultation and readmission depended upon the length of stay by adding both length of stay and its interaction with the timing of psychiatric consultation to the other variables of the Model 2. To ease the interpretation of such an interaction, length of stay was used in terciles. Should the interaction be significant, Model 2 was run again while stratifying the analyses on these terciles.

In order to ease the clinical interpretation of the results, we repeated the same analyses while replacing the timing of psychiatric consultation log-transformed continuous variable with a clinically interpretable binary variable taking values 1 (consultation after the 3rd day) or 0 (consultation on the 2nd or 3rd day). This definition of late compared to early consultation was drawn from the literature (23), taking into account the fact that we excluded patients who received an consultation on the day of admission.

Funding

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The study did not receive any funding.

Results

The study population selection is described in **Figure 1**. The final study population consisted of 4,498 participants (2298 women, 51%) with a mean age (standard deviation) of 59.8 (19.3) years. **Table 1** displays the characteristics of the study participants.

30-day hospital readmission

A total of 572 patients were readmitted within 30 days, representing 12.7% of the study population. Between-group comparisons are displayed in **Table 2**. Results from the univariate logistic regressions are displayed in the first column of **Table 3**, named "Model 0". The risk of 30-day readmission was significantly associated with later psychiatric consultation, longer length of stay and higher disease severity. Men were more likely to be readmitted than women, as were patients living farther from the hospital, admitted during the most recent years and aged 50 to 70 years old and, inversely, with a psychiatric diagnosis F1 "Mental and behavioral disorders due to psychoactive substance use", F2 "Schizophrenia, schizotypal and delusional disorders" or F6 "Disorders of adult personality and behavior". The type of ward was the only variable not significantly associated with the readmission rate.

The results of the multivariable models are detailed in **Table 3**. After adjusting for age and sex, later psychiatric consultations remained significantly associated with the risk of 30-day readmission (Model 1). This association persisted but slightly decreased after adjustment for year of admission, place of residence, type of ward, psychiatric diagnosis and disease severity (Model 2). After additional adjustment for length of stay, this association was no longer significant (Model 3).

According to our secondary aim, we further examined the role of length of stay in the association between the timing of consultation and readmission rate. There was a significant interaction (p=0.01) between the timing of consultation and the length of stay divided in terciles (i.e. less than 10 days,

10-21 days, longer than 21 days). After stratification by this variable using Model 2, the association between the timing of consultation and 30-day readmission was significant only for initial stays longer than 21 days (AOR=1.31, CI95 [1.12-1.53], p<0,001).

In order to ease the interpretation of the results, we replaced the log-transformed continuous variable with a binary variable (i.e. consultation after the 3rd day versus on the 2nd or 3rd day) in Model 2. Among patients with an initial stay longer than 21 days, the association between late (versus early) consultation and 30-day readmission was significant (15.8% versus 8.6%, AOR = 1.81, 95% CI [1.11;3.13], p = 0.02).

7-day hospital readmission

A total of 187 patients were readmitted within 7 days, representing 4.2% of the study population. Between-group comparisons are displayed in **Table 4**. Results from the univariate logistic regressions are displayed in the first column of Table 5, named "Model 0". The risk of 7-day readmission was associated with later psychiatric consultation and, inversely, with psychiatric diagnosis F0 "Organic, including symptomatic, mental disorders" or F6 "Disorders of adult personality and behavior" compared to F4 "Neurotic, stress-related and somatoform disorders".

The results of the multivariable models are detailed in **Table 5**. After adjusting for age and sex, later psychiatric consultation remained significantly associated with the risk of 7-day readmission (Model 1). This association remained significant after further adjustment for year of admission, place of residence, type of ward, psychiatric diagnosis and disease severity (Model 2), as well as after additional adjustment for length of stay (Model 3).

Similar to 30-day readmission, there was a significant interaction (p<0.01) between the timing of consultation and the length of stay in terciles (i.e. less than 10 days, 10-21 days, longer than 21 days). After stratification on this variable using Model 2, the association between the timing of consultation

and 7-day readmission was significant only for stays longer than 21 days (OR=1.57, 95% CI [1.19;2.09], p=0.002).

In order to ease the interpretation of the results, we replaced the log-transformed continuous variable with a binary variable (i.e. consultation after the 3rd day versus on the 2nd or 3rd day) in Model 2. Within the entire study population, the association between late (versus early) consultation and 7-day readmission was significant (4.6% versus 3.4%, OR=1.41, 95% CI [1.01;1.99], p = 0.046). Within the subpopulation of patients with a stay longer than 21 days, the association between late consultation and 7-day readmission was also significant (AOR=2.98, CI 95 % [1.16;9.88], p=0.04). In this subpopulation, the 7-day readmission rate of patients receiving early psychiatric consultation was 4.9% versus 1.8%, for those who had an earlier consultation.

Discussion

Summary of findings

In a large population of consecutive inpatients referred to a psychiatrist after admission to a general hospital, earlier psychiatric consultations were associated with a lower risk of 30-day and 7-day readmission. This association remained significant after adjustment for several potential confounders, including the severity of the disease. Our secondary aim was to examine the role of length of stay in this association. The timing of consultation was not associated with the 30-day readmission rate after adjustment for the length of stay in the whole study population. However, for stays longer than 21 days, a consultation on day 2 or 3 (versus afterwards) was associated with a 30-day readmission rate of 8.6% versus 15.8%. In other words, for 8 patients readmitted in the first case, there would have been fifteen in the second case, a difference that could be considered as clinically significant. Earlier psychiatric consultation was associated with lower 7-day readmission rate, even after adjustment for the length of stay. A consultation on day 2 or 3 (versus afterwards) was associated with a rate of 7-day readmission of 3.4% versus 4.6%. However, as with the 30-day readmission, this association was significant for stays longer than 21 days only. In this subpopulation,

for two patients readmitted in the first case, there would have been five in the second case, a difference that could be considered as clinically significant. Overall, our results support that the decrease in length of stay associated with earlier C-L psychiatry consultations (16), was not at the expense of a higher readmission rate.

Study in context

Over the past decade, hospital readmission has become a major issue in health policies, particularly in the United States since the Hospital Readmission Reduction Program established financial penalties for hospitals with higher-than-expected readmission rates (9). Numerous studies have tried to identify factors that could lower patients' risk of readmission. MEDLINE, Embase, and PsycINFO databases were searched from inception to January 1st 2022, for terms relating to hospital readmission and mental health interventions or consultation liaison psychiatry (in English, French, Spanish, Italian, German and Dutch).. Several systems initiatives have shown promise in minimizing general hospital readmissions, including improved collaboration between the care team, patient, and aftercare provider prior to discharge; enhanced patient education and empowerment; home visits or telephone calls by clinical providers; remote monitoring; transitional care managers; and early post-discharge follow-up(25,26). In a meta-analysis specifically on the effect of mental health interventions to reduce hospital readmission rates, only 3 of the 81 intervention studies found significant differences in readmission rates between intervention and comparison groups and all three of them targeted patients after discharge from the hospital. Studies based on structured models of proactive consultation-liaison show that it can reduce hospital length of stay, increase psychiatric consultation rate, and improve hospital staff satisfaction (27–29). One study on the impact of implementing a proactive psychiatric consultation service on length of stay reported no significant changes in readmission rates with the intervention (30). A randomized clinical study investigating whether proactive mental health services among older adults in the hospital reduces hospital length of stay and prevents readmissions is currently ongoing in the UK (the HOME study) (31).

Comparison with existing literature

The 30-day readmission rate in our sample was 12.7%, which is consistent with readmission rates observed in the literature for the general population (between 5% and 19%) (20) and slightly higher than the mean rate reported in Paris hospitals in 2016, which was 11.6% (32). The literature describes an increased risk of readmission for patients with psychiatric comorbidity (2,3), which might explain this higher rate in the present population.

There was a higher 30-day readmission rate for men, which is consistent with the literature (20,21,33). In 2016, the 30-day readmission rate observed in France was 12.6% for men and 10.2% for women (32). Patients aged 50 to 70 were the most frequently readmitted, which is common in 30-day readmission studies, and may be related to greater medical frailty, loss of autonomy or multiple comorbidities (34).

Patients with longer length of stay were more frequently readmitted. This association has contradicting results throughout the literature and is mainly confounded by the severity of the disease (21,35–37), which was also associated with a higher risk of readmission in the present population.

Strengths of the study

To our knowledge, this is the first study specifically on the association between the timing of psychiatric consultation and the risk of general hospital readmission in an adult population. The large sample size and the inclusion of consecutive inpatients who met a C-L psychiatrist for the first time are also important strengths of the study. Another strength of the study is the use of the date of the consultation rather than the date of the consultation request. Indeed, some studies used the date of the request without considering the consultation response time. These response times have an

impact on care and depend directly on the organization and resources allocated to the C-L psychiatry services. The C-L psychiatry service in which our study was conducted has a very short response time, the consultation usually occurring the same day or the day after the request is received.

Study limitations

This study has also several limitations. First, it is an observational study, so no causal conclusion can be drawn and the present results should mainly be considered as an impetus for future interventional studies. Indeed, although we have considered many confounding factors, there are still other factors that are known to affect hospital readmission and were not in the scope of our study, such as individual medical and socio-economic factors, pre and post-discharge interventions, transitional care interventions and access and quality of outpatient care (38). Also, later consultation can be requested for conditions representing barriers to discharge that are also risk factors for early readmission, such as chronic issues of behavior and mental health conditions interfering with recovery.

Second, we had no access to data regarding aftercare that may account to some extent for the associations with the risk of readmission.

Third, we did not use structured interviews for the psychiatric diagnosis, and we did not know if the reason for hospitalization was related to a suicide attempt. In contrast to other studies where researchers implemented proactive C-L service models (27), our results were based on retrospective data from a service that was implemented ten years prior to the study. Therefore, we are not able to provide a defined intervention or standardized clinical pathways that could be used in a replication study. Finally, even if our secondary aim was only exploratory, we acknowledge that multiple testing might have result in inflating type I error.

Explanatory hypotheses

Our results suggest an association between the timeliness of C-L psychiatry consultation and the risk of early readmission, particularly for patients with longer lengths of stays. Several hypotheses can account for this association. First, because psychiatric disorders can interfere with care and increase the risk of readmission, early management of these disorders could improve the whole person care (39,40). Since comorbid psychiatric conditions are associated with reduced quality of care (7–9), early consultation could prevent this added burden, partly related to the complex clinical presentation (or diagnosis overshadowing), and aspects related to poor communication or challenging behavior of the patient (41,42). In addition, other risk factors for readmission (e.g., cognitive impairment, poor social support, lack of motivation) are compounded by psychiatric disorders and are targeted by psychiatric consultations (9,43,44).

The negative association between ICU admissions and the risk of 30-day readmission **(Table 3)** was unexpected. Since it was not explained by the included variables, we may only speculate about possible explanations. A plausible one is that a substantial part of ICU admissions associated with a psychiatric intervention resulted from suicide attempts, leading to high probability of transfer to a psychiatry ward and lower probability of readmission in general hospital.

The negative association between organic mental disorders (e.g., delirium) and a lower 7-day readmission rates **(Table 5)** may sound at odds with the well-established association between delirium and poor outcomes. However, in the present population referred to a psychiatric consultant, a delirium episode might be associated with less specific or severe somatic issues than a delirium episode not referred to a psychiatrist. It might explain why, in our population, delirium was associated with a lower risk of 7-day readmission.

Conclusion

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Our study suggests an association between the timeliness of C-L psychiatry consultations and the risk of unplanned readmission. Although we cannot establish a causal link, these results show that, while being associated with a shorter length of stay (16), earlier C-L psychiatry consultations are not associated with the risk of unplanned readmission. Although hospital readmission is a complex subject, with many compounding factors, our study underlines the necessity of further studies on this aspect of the potential benefits of proactive C-L psychiatry on global quality of care.

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Authors statement and declaration of interest

Data availability

The data that support the findings of this study are available on request from the corresponding author, VL. The data are not publicly available due to their containing information that could compromise the privacy of research participants.

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Figures

Figure 1. Flow chart of the study population
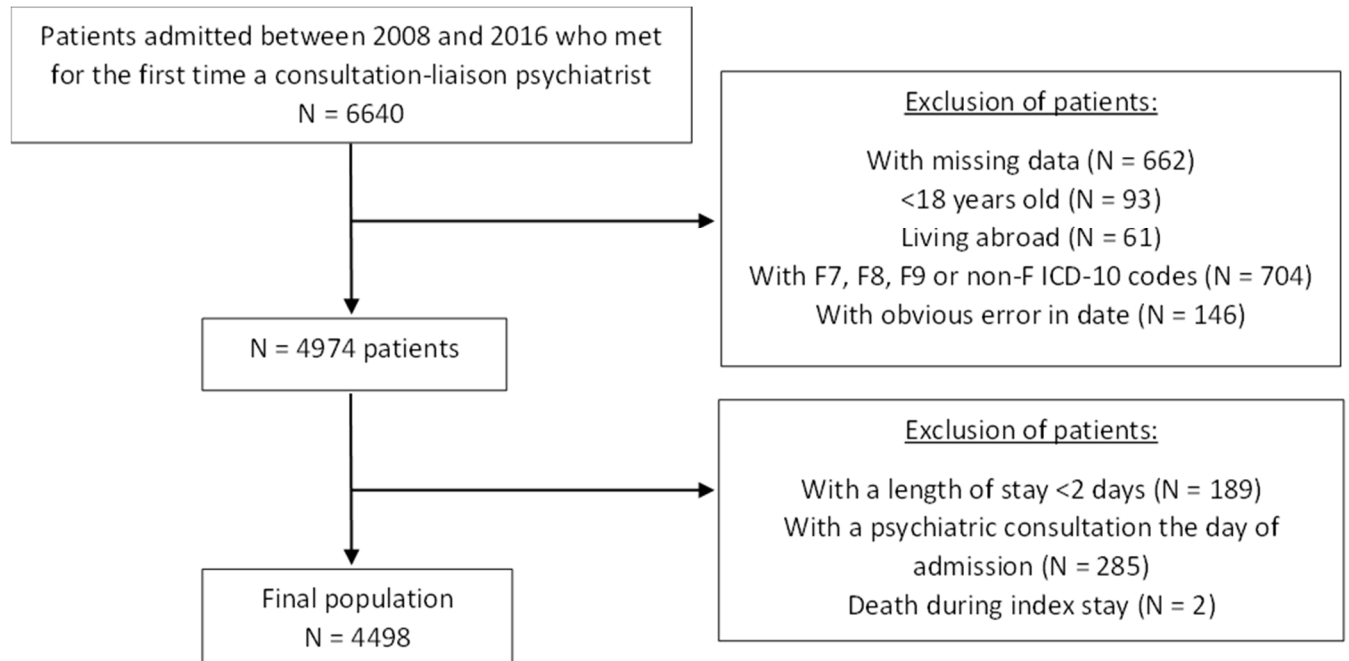
Table 1: Characteristics of study population (N=4,498)

Numerical variables					
	Mean	**Sd**		**Min**	**Max**
Days prior to the consultation	8.84	12.39		1	207
Length of stay (days)	21.73	24.66		2	286
Age (years)	59.77	19.32		18	105
Disease severity (GHS, in k€)	8.12	7.65		0.6	78.38

Categorical variables			
	Level	N	%
Sex	Women	2298	51
	Men	2200	49
Place of residence	Hospital area	1040	23
	Outside hospital area	3458	78
Year of admission	2008-2010	916	20
	2011-2013	1411	31
	2014-2016	2171	48
Type of ward	Medical Unit	2389	53
	Surgery	1284	29
	Intensive care	825	18
Psychiatric diagnosis	F0	488	11
	F1	301	7
	F2	425	9
	F3	1175	26
	F4	1799	40
	F5	60	1
	F6	250	6
Age (in categories)	[18,30]	414	9
	(30,40]	422	9
	(40,50]	578	13
	(50,60]	762	17
	(60,70]	831	18
	(70,80]	763	17
	(80,105]	728	16
30-day readmission	Yes	572	13
	No	3926	87
7-day readmission	Yes	187	4
	No	4311	96

sd = standard deviation; F0 = "Organic, including symptomatic, mental disorders"; F1 = "Mental and behavioral disorders due to psychoactive substance use"; F2 = Schizophrenia, schizotypal and delusional disorders"; F3 = "Mood disorders"; F4 = "Neurotic, stress-related and somatoform disorders"; F5 = "Behavioral syndromes associated with physiological disturbances and physical factors"; F6 = "Disorders of adult personality and behavior"; GHS = "Groupe Homogène de Séjour" French version of the DRG-based fee, as proxy of disease severity.

Table 2: Comparisons between 30-day readmitted patients and non-readmitted patients

30-day readmission					
Numerical variables					
	No (N=3926, 87,3%)		**Yes** (N=572, 12,7%)		t-test
	Mean	Sd	Mean	Sd	p^{a}
Days prior to consult.	8.46	11.7	11.32	16.4	<0.001
Length of stay	21.1	23.3	27	32.4	<0.001
Disease severity (GHS in k€)	7.9	7.3	9.3	9.5	0.002
Categorical variables					
	No		**Yes**		Chi^2
	Level	N	%	N	%	p^{b}
Sex	Women	2036	52	262	46	0.007
	Men	1890	48	310	54	
Place of residence	Hospital area	933	24	107	19	0.003
	Elsewhere	2993	76	465	81	
Year of admission	2008-2010	817	21	99	17	0.050
	2011-2013	1239	32	172	30	
	2014-2016	1870	48	324	53	
Type of ward	Medical Unit	2065	53	324	57	0.14
	Surgery	1127	29	157	27	
	Intensive care	734	19	91	16	
Psychiatric diagnosis	F0	432	11	56	10	0.01
	F1	273	7	28	5	
	F2	384	10	41	7	
	F3	1020	26	155	27	
	F4	1539	39	260	45	
	F5	51	1	9	2	
	F6	227	6	23	4	
Age (in categories)	[18,30]	370	9	44	8	0.01
	(30,40]	376	10	46	8	
	(40,50]	507	13	71	12	
	(50,60]	657	17	105	18	
	(60,70]	697	18	134	23	
	(70,80]	665	17	98	17	
	(80,105]	654	17	74	13	

[a] p calculated with Student's t-test ; [b] p calculated with Chi-square test, sd = standard deviation; F0 = "Organic, including symptomatic, mental disorders"; F1 = "Mental and behavioral disorders due to psychoactive substance use"; F2 = Schizophrenia, schizotypal and delusional disorders"; F3 = "Mood disorders"; F4 = "Neurotic, stress-related and somatoform disorders"; F5 = "Behavioral syndromes associated with physiological disturbances and physical factors"; F6 = "Disorders of adult personality and behavior"; GHS = "Groupe Homogène de Séjour" French version of the DRG-based fee, as proxy of disease severity.

Table 3: Logistic regression models for 30-day hospital readmission

Variables		Model 0		Model 1		Model 2		Model 3	
		OR	IC 95 %	OR	IC 95 %	OR	IC 95 %	OR	IC 95 %
Log(consultation delay)	(in days)	**1.25***	1.15-1.36	**1.24***	1.14-1.35	**1.21***	1.10-1.33	**1.10**	0.98-1.24
Age (in category)	(18,30]	1.05	0.71-1.56	1.09	0.73-1.62	1.22	0.80-1.86	1.27	0.83-1.94
	(30,40]	1.08	0.73-1.60	1.15	0.77-1.70	1.31	0.87-1.98	1.36	0.90-2.05
	(40,50]	1.24	0.88-1.94	1.28	0.90-1.82	1.42	0.98-2.04	1.45	1.00-2.09
	(50,60]	1.41*	1.03-1.94	1.43*	1.04-1.98	1.57*	1.13-2.20	1.60*	1.15-2.24
	(60,70]	1.70*	1.25-2.30	1.66*	1.23-2.26	1.77*	1.29-2.43	1.79*	1.31-2.46
	(70,80]	1.30	0.95-1.80	1.29	0.94-1.79	1.38	0.86-1.47	1.37	0.99-1.90
	(80,105]	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Sex	Men (vs. Women)	1.27*	1.07-1.52	1.21*	1.01-1.45	1.23*	1.02-1.47	1.22*	1.02-1.47
Year of admission	2008-2010	Ref	Ref			Ref	Ref	Ref	Ref
	2011-2013	1.15	0.88-1.49			1.13	0.86-1.47	1.15	0.88-1.51
	2014-2016	1.33*	1.04-1.69			1.36*	1.06-1.74	1.39*	1.09-1.79
Place of residence	Hospital area (vs elsewhere)	0.74*	0.59-0.92			0.78*	0.61-0.98	0.78*	0.62-0.99
Type of ward	Medical Unit	Ref	Ref			Ref	Ref	Ref	Ref
	Surgery	0.89	0.72-1.09			0.70*	0.56-0.88	0.70*	0.56-0.87
	Intensive care	0.79	0.62-1.01			0.64*	0.48-0.84	0.61*	0.46-0.80
Psychiatric diagnosis	F0	0.76	0.56-1.04			0.78	0.57-1.07	0.77	0.56-1.06
	F1	0.61*	0.40-0.92			0.60*	0.39-0.90	0.59*	0.38-0.90
	F2	0.63*	0.45-0.89			0.75	0.52-1.07	0.72	0.50-1.03
	F3	0.90	0.73-1.11			0.98	0.78-1.22	0.98	0.78-1.22
	F4	Ref	Ref			Ref	Ref	Ref	Ref
	F5	1.04	0.51-2.15			1.15	0.52-2.27	1.17	0.54-2.32
	F6	0.60*	0.38-0.94			0.68	0.42-1.06	0.70	0.42-1.09
Disease severity	(GHS in k€)	1.20*	1.09-1.32			1.14*	1.01-1.28	1.07	0.94-1.22
Log(Length of stay)	(in days)	1.29*	1.18-1.42					1.22*	1.05-1.40

* : p<0.05 ; OR : Odds Ratio ; IC 95% : 95% confidence interval ; Ref=level of reference. F0 = "Organic, including symptomatic, mental disorders"; F1 = "Mental and behavioral disorders due to psychoactive substance use"; F2 = Schizophrenia, schizotypal and delusional disorders"; F3 = "Mood disorders"; F4 = "Neurotic, stress-related and somatoform disorders"; F5 = "Behavioral syndromes associated with physiological disturbances and physical factors"; F6 = "Disorders of adult personality and behavior"; GHS = "Groupe Homogène de Séjour" French version of the DRG-based fee, as proxy of disease severity.

Table 4: Comparisons between 7-day readmitted patients and non-readmitted patients

7-day readmission						
Numerical variables						
	No			**Yes**		t-test
	(N=4311, 96%)			(N=187, 4%)		
	Mean	Sd		Mean	Sd	p [a]
Days prior to consult.	8.8	12.3		11.0	13.5	0.02
Length of stay	21.7	24.4		25.01	30.8	0.15
Disease severity (GHS in k€)	8.1	7.7		8.5	7.2	0.42
Categorical variables						
	No			**Yes**		Chi^2
	Level	N	%	N	%	p [b]
Sex	Women	2210	51	88	47	0.26
	Men	2101	49	99	53	
Place of residence	Hospital area	1002	23	38	20	0.35
	Elsewhere	3309	77	149	80	
Year of admission	2008-2010	878	20	38	20	0.51
	2011-2013	1359	32	52	28	
	2014-2016	2074	48	97	52	
Type of ward	Medical Unit	2287	53	102	55	0.91
	Surgery	1233	29	51	27	
	Intensive care	791	18	34	18	
Psychiatric diagnosis	F0	476	11	12	6	0.1
	F1	291	7	10	5	
	F2	405	9	20	11	
	F3	1121	26	54	29	
	F4	1714	40	85	45	
	F5	58	1	2	1	
	F6	246	6	4	2	
Age (in categories)	[18,30]	397	9	17	9	0.76
	(30,40]	405	9	17	9	
	(40,50]	555	13	23	12	
	(50,60]	728	17	34	18	
	(60,70]	789	18	42	22	
	(70,80]	733	17	30	16	
	(80,105]	704	16	24	13	

[a] p calculated with Student's t-test ; [b] p calculated with Chi-square test, sd = standard deviation; F0 = "Organic, including symptomatic, mental disorders"; F1 = "Mental and behavioral disorders due to psychoactive substance use"; F2 = Schizophrenia, schizotypal and delusional disorders"; F3 = "Mood disorders"; F4 = "Neurotic, stress-related and somatoform disorders"; F5 = "Behavioral syndromes associated with physiological disturbances and physical factors"; F6 = "Disorders of adult personality and behavior"; GHS = "Groupe Homogène de Séjour" French version of the DRG-based fee, as proxy of disease severity.

Table 5: Logistic regression models for 7-day readmission

Variables		Model 0		Model 1		Model 2		Model 3	
		OR	IC 95 %	OR	IC 95 %	OR	IC 95 %	OR	IC 95 %
Log(consultation delay)	(in days)	**1.22***	1.06-1.40	**1.22***	1.06-1.40	**1.26***	1.08-1.48	**1.28***	1.05-1.57
Age (in categories)	(18,30]	1.26	0.67-2.37	1.32	0.70-2.50	1.44	0.73-2.83	1.43	0.73-2.82
	(30,40]	1.23	0.65-2.32	1.32	0.69-2.49	1.42	0.73-2.78	1.41	0.72-2.77
	(40,50]	1.22	0.68-2.18	1.27	0.70-2.28	1.32	0.72-2.44	1.32	0.71-2.43
	(50,60]	1.37	0.81-2.34	1.40	0.82-2.40	1.45	0.83-2.53	1.45	0.83-2.53
	(60,70]	1.56	0.94-2.61	1.54	0.92-2.58	1.59	0.94-2.70	1.59	0.94-2.70
	(70,80]	1.20	0.70-2.08	1.19	0.69-2.07	1.26	0.73-2.19	1.26	0.73-2.20
	(80,105]	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Sex	Men (vs. Women)	1.18	0.88-1.59	1.12	0.83-1.50	1.14	0.85-1.55	1.14	0.85-1.55
Year of admission	2008-2010	Ref	Ref			Ref	Ref	Ref	Ref
	2011-2013	0.88	0.58-1.36			0.87	0.57-1.34	0.87	0.56-1.34
	2014-2016	1.08	0.74-1.59			1.12	0.76-1.66	1.12	0.76-1.66
Place of residence	Hospital area (vs elsewhere)	0.84	0.59-1.21			0.87	0.59-1.27	0.87	0.59-1.27
Type of ward	Medical Unit	Ref	Ref			Ref	Ref	Ref	Ref
	Surgery	0.93	0.66-1.31			0.82	0.56-1.19	0.82	0.56-1.19
	Intensive care	0.96	0.65-1.43			0.90	0.58-1.40	0.91	0.58-1.41
Psychiatric diagnosis	F0	0.51*	0.27-0.93			0.52*	0.28-0.97	0.52*	0.28-0.98
	F1	0.69	0.36-1.35			0.69	0.35-1.36	0.69	0.35-1.37
	F2	1.00	0.60-1.64			1.14	0.68-1.91	1.15	0.68-1.93
	F3	0.97	0.68-1.38			1.08	0.75-1.54	1.08	0.75-1.54
	F4	Ref	Ref			Ref	Ref	Ref	Ref
	F5	0.70	0.17-2.90			0.73	0.17-3.06	0.73	0.17-3.05
	F6	0.33*	0.12-0.90			0.36	0.13-0.99	0.36	0.13-0.99
Disease severity	(GHS in k€)	1.01	0.99-1.02			1	0.97-1.02	1.00	0.97-1.02
Log(Length of stay)	(in days)	1.14	0.97-1.33					0.97	0.76-1.23

* : p<0.05 ; OR : Odds Ratio ; IC 95% : 95% confidence interval ; Ref=level of reference. F0 = "Organic, including symptomatic, mental disorders"; F1 = "Mental and behavioral disorders due to psychoactive substance use"; F2 = Schizophrenia, schizotypal and delusional disorders"; F3 = "Mood disorders"; F4 = "Neurotic, stress-related and somatoform disorders"; F5 = "Behavioral syndromes associated with physiological disturbances and physical factors"; F6 = "Disorders of adult personality and behavior"; GHS = "Groupe Homogène de Séjour" French version of the DRG-based fee, as proxy of disease severity.