



## Emergency department care for patients with mental health problems, a longitudinal registry study and a before and after intervention study

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### ABSTRACT

**Objective:** To describe the numbers and length of stay (LOS) of patients with mental health (MH) problems at a Dutch emergency department (ED) and the effect of a psychiatric intervention team (PIT) on patient flow.

**Methods:** A longitudinal design was used to assess number of MH presentations and LOS during a 3-year period (2014–2016). In 2017, we introduced a PIT during ED peak hours, to reduce LOS for patients with MH problems. We evaluate the effects of the PIT on patients' LOS with an 18-month before and after intervention study (2017–2018).

**Results:** Total number of ED presentations increased with 4%. Total number of MH presentations increased with 23% from 2014 to 2016. LOS increased by 28 min (95 min vs. 123 min) for all presentations, while not changing for MH presentations (2014: 195 min, interquartile range (IQR) 120–293 and 2016: 190 min, IQR 116–296). In the before and after intervention study, number of MH presentations increased with 36% while LOS decreased with 46 min ( $p < 0.001$ ).

**Conclusions:** The number of MH presentations increased over the three years while LOS remained similar. In the before and after intervention study, number of presentations increased even more while LOS decreased significantly. Specialist psychiatric input reduces ED LOS.

### 1. Introduction

Research shows that patients presenting to the emergency department (ED) with mental health (MH) problems experience longer length of stay (LOS) compared to the general ED population [1,2], impacting ED crowding and leading to decreased patient, family, and staff satisfaction and increased costs related to monitoring of aggressive or suicidal patients by medical or security staff [1,3,4].

Although waiting times and patients' LOS at Dutch EDs are short compared with international standards [5], the majority of the EDs face crowding issues since a few years [6]. Crowding issues are expected to worsen in the Netherlands due to socio-demographic developments such as the ageing population, the nursing shortage, and ED closures.

Not only do patients with MH problems contribute to crowding, crowding may also have stress-inducing effects on these patients [7]. The ED environment has little privacy because of safety concerns [8], which may exacerbate the symptoms of patients with MH problems [1,9]. Their hospital admission rate may be up to 2.5 times higher than that of the general ED population, and delays in accessing inpatient beds for admitted patients (i.e. boarding) affects patients with MH problems disproportionately [10,11]. Boarding is more problematic in these patients, contributing to behavioural problems and departure of patients before receipt of care [9].

Previously reported trends in Australia, Canada and the USA indicate an increase in MH patients presenting to hospital EDs and lengthy stays for these patients [12–14]. The trend in the number and

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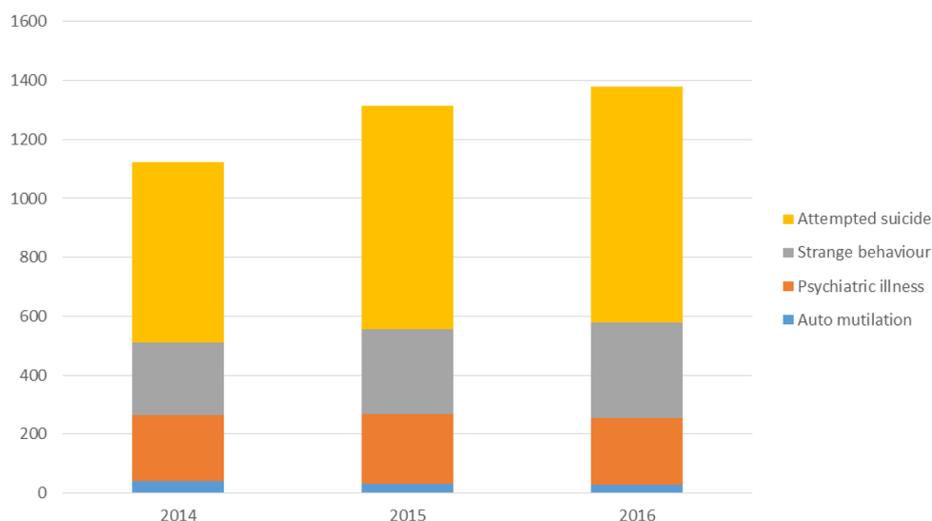


Fig. 1. Annual number of mental health visits.

LOS of MH presentations in the Netherlands is unknown.

This study describes the number of ED presentations for MH problems, LOS, and admission percentage over a three-year period. Subsequently, the LOS for MH patients before and after the installation of a psychiatric intervention team (PIT) at the ED was assessed. We hypothesized that installing a psychiatric team at the ED as opposed to having a psychiatric team on call would improve flow of MH patients.

## 2. Methods

### 2.1. Study design and setting

This study was performed at HMC Westeinde, a Dutch inner-city hospital with 53,000 ED presentations annually. The 28-bed ED serves as an adult and paediatric teaching hospital and trauma center. Emergency physicians (EPs) work side by side with residents and medical specialists.

In the ED, patients with MH problems are generally assessed first physically, and when psychiatric expertise is needed, a consultation liaison psychiatrist or an outpatient psychiatric team (OPT) is available. The consultation liaison psychiatrist is responsible for MH patients who need to be admitted to the general hospital. The OPT is responsible for the psychiatric evaluation of MH patients in hospitals, police stations and public buildings. Waiting time for OPT assessment depends on the number of persons in the city awaiting psychiatric evaluation and their level of urgency. In this paper, the OPT is considered usual psychiatric care.

During a 9-month intervention period, a PIT was added to the usual psychiatric care. The PIT was physically present at the ED during peak hours of the day (15:30 h to 00:00 h). The aim of the PIT was to reduce waiting times and LOS of patients with MH problems. The PIT could be consulted by the EP whenever he or she needed psychiatric consultation for a patient, for example for patients presenting to the ED after a suicide attempt. In both the PIT and the OPT a psychiatrist or psychiatry resident and a psychiatric nurse are seated.

Our study comprised two parts:

1. First, a 3-year longitudinal design was used to investigate the trend in number of MH presentations, LOS, and admission percentage. Patients were included when presenting from January 1, 2014 – December 31, 2016 with a MH-related primary complaint.

2. Second, a before-and-after analysis was used to compare patient and visit characteristics between the control period (May 1, 2016 – February 4, 2017) in which usual psychiatric care was available and the intervention period (May 1, 2017 – February 4, 2018) in which the PIT was added to usual psychiatric care. Patients with a MH-related primary complaint presenting during peak hours were included. Visits were excluded when patients left without being seen by a medical professional (LWBS), and when patients were admitted to the general hospital. The latter patients are assessed by the consultation liaison psychiatrists.

The study was approved by the Institutional Review Board (Southwest Holland, nr. 17–107).

### 2.2. Outcome measures and analysis

For the first part of the study, we describe the number of MH presentations, ED LOS, and admission percentages per year and per category of presenting problem.

For the second part of the study, patient and visit characteristics were compared between the control period and the intervention period, and within the intervention period between patients who were assessed by the PIT and patients who were assessed by the OPT. Data were analysed with SPSS 22.0 using descriptive statistics, *t*-tests, Mann Whitney-*U* tests and Chi<sup>2</sup> tests where appropriate. Significance threshold was set at  $p < 0.05$ .

## 3. Results

### 3.1. Three year trend in mental health presentations, length of stay and admission percentage

In total, 153,820 ED presentations were registered during the 3-year period. ED presentations increased with 4% from 50,374 (in 2014) to 52,424 (in 2016). Of the total ED presentations, 2.5% ( $n = 3,816$ ) were presentations for a MH problem. The primary reason for the ED visit was suicidality ( $n = 2,168$ ). Total MH presentations increased with 23% from 1,123 (in 2014) to 1,380 (in 2016) (Fig. 1).

While median LOS for the total population increased with 28 min from 2014 to 2016 (95 min vs. 123 min), it did not change for MH presentations (2014: 195 min, interquartile range (IQR) 120–293 and 2016: 190 min, IQR 116–296).

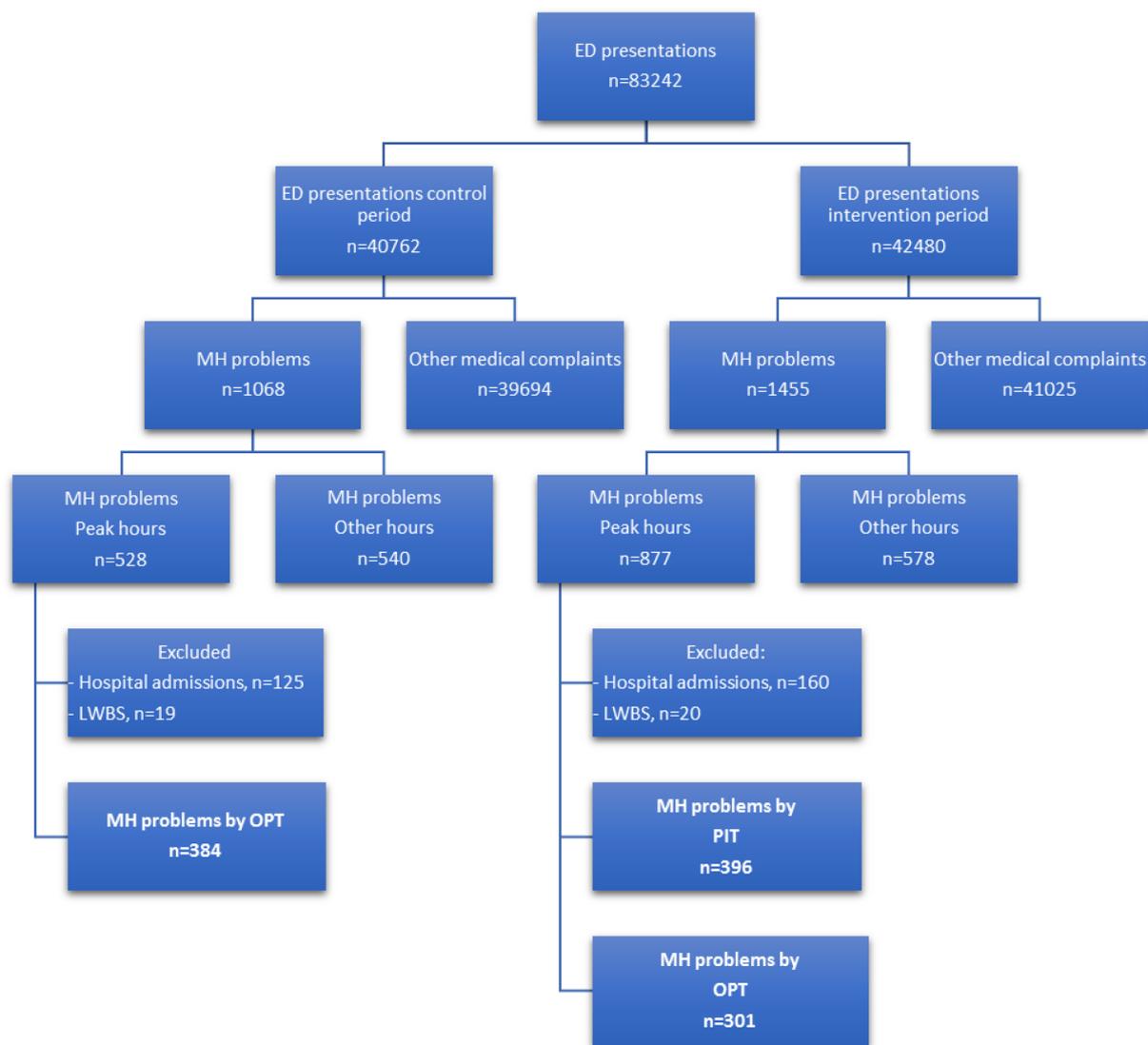


Fig. 2. Flow diagram of patient presentations during the control period and the intervention period. Abbreviations: ED, emergency department; LWBS, left without being seen; MH, mental health; OPT, outpatient psychiatric team; PIT, psychiatric intervention team.

Within the total population, the inpatient admission percentage increased from 20.2 (2014) to 22.7% (2016). Within the MH presentations the admission percentage decreased from 36.2% (2014) to 34.2% (2016).

### 3.2. Effects of the psychiatric intervention team

There were 40,762 ED presentations during the 9-month control period and 42,480 during the 9-month intervention period. Three percent of the patients ( $n = 2,523$ ) presented with a primary MH problem: 1,068 in the control period and 1,455 in the intervention period, a 36% increase in MH presentations. In the control period, 528 patients arrived during peak hours. In the intervention period 877 patients arrived during peak hours. Excluded were 324 visits; 285 patients were admitted to the general hospital and 39 LWBS. The remaining 1,081 visits were included, 384 in the control period and 697 in the intervention period. In the intervention period, 396 patients (56.8%) were assessed by the PIT and 301 (43.2%) by the OPT (Fig. 2).

Patient and visit characteristics are shown in Table 1. Compared with the OPT, the PIT assessed less patients who arrived by ambulance ( $p < 0.001$ ) and less patients with suicide attempts, but more patients with psychiatric illness ( $p < 0.001$ ).

Median LOS of MH patients assessed by the PIT (159 min) was significantly shorter than LOS of MH patients in the control period (205 min,  $p < 0.001$ ), and compared to patients in the intervention period who were assessed by the OPT (175 min,  $p < 0.001$ ) (Table 2). The PIT assessed significantly more patients within 4 h compared to the OPT in the control period (72.3% vs. 57.3%,  $p < 0.001$ ).

Patients who were assessed by the PIT were more often admitted in a psychiatric hospital (16.9%) compared with the MH patients who were assessed by the OPT in the intervention period (9.0%,  $p < 0.003$ ). The percentage of patients who were given an appointment for psychiatric outpatient care was also higher in the group that was assessed by the PIT (24.0%) compared with the patients assessed by the OPT during the control period (15.1%,  $p = 0.002$ ) and the patients assessed by the OPT in the intervention period ( $p < 0.001$ ).

## 4. Discussion

ED staff struggles with crowding, increased patient boarding, and lengthy stays for MH patients. The results of this paper provide insight into the patterns of MH presentations in a Dutch ED. The results of our before- and after analysis suggest that having specialist psychiatric expertise at the ED reduces LOS of MH patients.

**Table 1**  
Demographics and characteristics of mental health patients.

Characteristics	A Control period Patient presentations handled by OPT N = 384	B Intervention period Patient presentations handled by the PIT N = 396	C Intervention period Patient presentations handled by the OPT N = 301	P-Value <sup>1</sup> A-B	P-Value <sup>1</sup> B-C
Median age (IQR) <sup>1,2</sup>	42 (27–55)	42 (30–53)	35 (26–53)	0.81	0.01
<i>Age groups, n (%)</i>					
0–15 y	16 (4.2)	6 (1.7)	15 (5.0)	0.05	0.02
16–30 y	99 (25.9)	87 (24.9)	93 (31.0)	0.74	0.08
31–45 y	107 (28.0)	113 (32.3)	90 (30.0)	0.21	0.53
46–60 y	112 (29.3)	98 (28.0)	60 (20.0)	0.69	0.02
61–75 y	43 (11.3)	36 (10.3)	30 (10.0)	0.67	0.90
76 y and older	5 (1.3)	10 (2.9)	12 (4.0)	0.14	0.42
Gender (male), n (%)	240 (62.5)	207 (52.3)	171 (56.8)	0.004	0.23
<i>Transport, n (%)<sup>3</sup></i>					
Ambulance	213 (55.6)	110 (31.7)	174 (58.0)	< 0.001	< 0.001
Police	8 (2.1)	2 (0.6)	2 (0.7)	0.11	0.88
Walk/car/other	162 (42.3)	235 (67.7)	124 (41.3)	< 0.001	< 0.001
Self-referred, n (%) <sup>3</sup>	106 (27.7)	107 (30.8)	73 (24.3)	0.35	0.07
<i>Acuity level, n (%)<sup>4,5</sup></i>					
High urgent	136 (35.4)	58 (24.7)	97 (32.2)	0.01	0.06
Urgent	201 (52.3)	120 (51.1)	167 (55.5)	0.76	0.31
Standard	47 (12.2)	57 (24.3)	37 (12.3)	< 0.001	< 0.001
<i>Presenting problem, n (%)<sup>5,6</sup></i>					
Attempted suicide	215 (56.0)	56 (23.8)	179 (59.5)	< 0.001	< 0.001
Auto mutilation	12 (3.1)	4 (1.7)	3 (1.0)	0.28	0.48
Psychiatric illness	91 (23.7)	147 (62.6)	63 (20.9)	< 0.001	< 0.001
Strange behaviour	66 (17.2)	28 (11.9)	56 (18.6)	0.08	0.04

<sup>1</sup>P-values were calculated using  $\chi^2$  tests, except for median age, which was calculated using the Mann-Whitney *U* test, and police transport, which was calculated using the Fisher Exact test; <sup>2</sup> Age and age categories are based on 732 presentations due to 48 missing values (A-B) and 650 presentations due to 47 missing values (B-C); <sup>3</sup> Transport and referral were based on 730 presentations (A-B) and 647 presentations (B-C) due to 50 missing values; <sup>4</sup>Acuity level based on the Manchester Triage System; <sup>5,6</sup> Acuity level and presenting problem were based on 619 presentations (A-B) and 536 presentations (B-C) due to 161 missing values.

\* Abbreviations: IQR, interquartile range; OPT, outpatient psychiatric team; PIT, psychiatric intervention team.

During the 3-year longitudinal study, a 4% increase in total ED presentations and a 23% increase in MH presentations were found. Reasons for the increase in MH presentations may be similar as described in other countries: reduced community psychiatric services due to budget cuts, increasing social and economic stressors and the reduction of psychiatric beds. While our results show an above average increase in MH presentations, our number of MH presentations as a percentage of the total number of ED presentations (2.5%) pales by comparison to international reports, such as the 4.5% of ED visits in Australia [4], or 12.5% of ED visits in an American ED [13].

The increase in MH presentations during the intervention period may be induced by the project: GPs in the city may have preferably referred their patients to the HMC instead of spreading them over the EDs in the city. Also, having the PIT readily available during the peak hours may have led to more consultations of the PIT by the ED staff.

Although LOS for our MH patients was significantly longer than LOS of our general ED population, it is considerably shorter than averages reported from other countries [2,15]. Still, delivering timely psychiatric care is increasingly challenging according to Dutch ED staff [16]. Lengthy stays for MH patients may be due to general health care trends: fewer EDs, more use of diagnostic testing, and limited availability of inpatient beds or appropriate aftercare [17]. Another cause for lengthy stays for MH patients may be that in most patients, more than one consulting physician is needed, and psychiatry is the last consulting service in line. For example, when a patient arrives at the ED after a suicide attempt, clinical stability needs to be achieved by the medical team first. It may take many hours before a psychiatrist can assess the patient. Extended ED stays for patients with MH problems may also be explained by the psychiatric triage practice. During busy shifts for the OPT, MH patients who need psychiatric evaluation in their home environment are likely to be triaged to more urgent psychiatric evaluation than MH patients who are waiting in the ED environment, possibly leading to extended stays at the ED for the latter patients.

The project showed that a PIT, readily available at the ED, significantly

reduced the LOS of MH patients. We hypothesize that this is mainly caused by a decrease in the time between entering the ED and the start of the psychiatric evaluation (“door to psychiatry time”). In the PIT group there were significantly less patients with suicide attempts and less patients with strange behaviour. For patients with suicide attempts as well as for patients with strange behaviour, a medical evaluation is needed before a psychiatric evaluation is possible. Obviously, patients who need a medical evaluation before a psychiatric evaluation will have a longer door to psychiatry time [13]. The difference in psychiatric conditions is probably due to the referral policy of the psychiatric service, which dictated that the patient had to be nonviolent and cooperative when referred to the ED PIT instead of home assessment by the OPT.

The PIT project team aimed for reduced waiting times and for a better risk assessment of aggression, suicidality and other behavioural problems arising from psychiatric disorders in patients with somatic problems. At the start of the project there was a significant amount of ED staff resistance. ED staff feared for an increased number of psychiatric patients, increased violence and aggressive behaviour, and long waiting times. While our study shows that the number of MH patients did indeed increase, it also shows that waiting times did not. Along the way, ED staff became enthusiastic about the project. More research is needed to assess the impact of the PIT on risk assessment of psychiatric disorders in patients with somatic problems.

## 5. Limitations

Sampling bias is a potential limitation of this study. MH presentations were identified using chief complaints, excluding those with a medical or non-psychiatric primary presenting complaint. We expect, therefore, that the incidence rate of MH presentations is an underestimation. For example, cases of deliberate self-harm involving laceration may have been reported as wound rather than as auto mutilation or suicide attempt.

Other measures taken to improve patient flow might have influenced ED patients' LOS. However, there were no other changes in

**Table 2**  
Length of stay and disposition of mental health patient presentations.

Outcomes	A Control period Patient presentations handled by the OPT <sup>a</sup> N = 384	B Intervention period Patient presentations handled by the PIT <sup>a</sup> N = 396	C Intervention period Patient presentations handled by the OPT <sup>a</sup> N = 301	P-Value <sup>1</sup> A-B	P-Value <sup>1</sup> B-C
Median LOS <sup>2</sup> , minutes (IQR <sup>3</sup> )	205 (112–328)	159 (95–261)	175 (111–328)	< 0.001	< 0.001
LOS < 4 h, n (%) <sup>2</sup>	220 (57.3)	253 (72.3)	186 (61.8)	< 0.001	0.01
LOS 4–8 h, n (%)	118 (30.7)	78 (22.3)	80 (26.6)	0.01	0.21
LOS 8 h or longer, n (%)	46 (12.0)	19 (5.4)	35 (11.6)	0.002	0.01
Disposition from ED, n (%) <sup>2</sup>					
Admitted, psychiatric hospital	49 (12.8)	59 (16.9)	27 (9.0)	0.12	0.003
Psychiatric outpatient clinic	58 (15.1)	84 (24.0)	30 (10.0)	0.002	< 0.001
Discharged	276 (72.1)	207 (59.1)	244 (81.1)	< 0.001	< 0.001

<sup>1</sup>P-values were calculated using  $\chi^2$  tests, except for median LOS, which was calculated using the Mann-Whitney U test; <sup>2</sup>LOS, LOS categories, and disposition were based on 734 presentations (A-B) and 651 presentations (B-C) due to 46 missing values.

\* Abbreviations: ED, emergency department; IQR, interquartile range; LOS, length of stay; OPT, outpatient psychiatric team; PIT, psychiatric intervention team.

management of patients with MH problems during the control period and intervention period.

This study conveys the experience of one ED and our findings may not be generalizable to other EDs due to social and cultural differences between patient populations and differences in organisational structure.

Future studies in this topic area could benefit from a more controlled design and a more comprehensive reporting system to include all MH presentations. Ideally, a future study should incorporate an economic evaluation to determine whether a PIT is a cost-effective way to allocate healthcare resources.

## 6. Conclusions

MH presentations represent an increasing burden on this Dutch ED. However, while the number of MH presentations further increased during the intervention period in which the PIT was available, ED LOS decreased. Specialist psychiatric input reduces LOS for patients presenting to the ED.

## Conflicts of interest

Naomi van der Linden is employed by AstraZeneca Netherlands, a pharmaceutical company.

## Ethical statement

The ethical review committee of Southwest Holland, nr. 17–107, granted approval and exemption. Patient consent was not required.

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## Author contributions

MCL designed the study. MCL undertook and managed the data collection, including quality control. NL provided statistical advice on study design. MCL and NL analysed the data; MCL and NL drafted the manuscript, and all authors contributed substantially to its revision. MCL takes responsibility for the paper as a whole.

## References

- [1] Manton A. Psychiatric Patients in the Emergency Department: The Dilemma of Extended Length of Stay, < [https://www.apna.org/files/public/Psychiatric\\_Patients\\_in\\_the\\_Emergency\\_Department\\_The\\_Dilemma\\_of\\_Extended\\_Lengths\\_of\\_Stay.pdf](https://www.apna.org/files/public/Psychiatric_Patients_in_the_Emergency_Department_The_Dilemma_of_Extended_Lengths_of_Stay.pdf) > ; 2010 [accessed April 8, 2018].
- [2] Weiss AP, Chang G, Rauch SL, Smallwood JA, Schechter M, Kosowsky J, et al. Patient- and practice-related determinants of emergency department length of stay for patients with psychiatric illness. *Ann Emerg Med* 2012;60:162–71.
- [3] Atzema CL, Schull MJ, Kurdyak P, Menezes NM, Wilton AS, Vermuelen MJ, et al. Wait times in the emergency department for patients with mental illness. *CMAJ* 2012;184:E969–76.
- [4] Bost N, Crilly J, Wallen K. The impact of a flow strategy for patients who presented to an Australian emergency department with a mental health illness. *Int Emerg Nurs* 2015;23:265–73.
- [5] van der Linden N, van der Linden MC, Richards JR, Derlet RW, Grootendorst DC,

- van den Brand CL. Effects of emergency department crowding on the delivery of timely care in an inner-city hospital in the Netherlands. *Eur J Emerg Med* 2015;23:337–43.
- [6] van der Linden C, Reijnen R, Derlet RW, Lindeboom R, van der Linden N, Lucas C, et al. Emergency department crowding in The Netherlands: managers' experiences. *Int J Emerg Med* 2013;6:41.
- [7] Edmondson D, Kronish IM, Wasson LT, Giglio JF, Davidson KW, Whang W. A test of the diathesis-stress model in the emergency department: who develops PTSD after an acute coronary syndrome? *J Psychiatr Res* 2014;53:8–13.
- [8] Hefflefinger L. Transforming psychiatric care delivery in the emergency department: one hospital's journey. *J Emerg Nurs* 2014;40:365–70.
- [9] Bender D, Pande N, Ludwig M, The Lewin Group. A literature review: Psychiatric Boarding. 29-10-2008. U.S. Department of Health and Human Services, Assistant Secretary for Planning and Evaluation, Office of Disability, Aging and Long-Term Care Policy, < <https://aspe.hhs.gov/pdf-report/literature-review-psychiatric-boarding> > .
- [10] Nicks BA, Manthey DM. The impact of psychiatric patient boarding in emergency departments. *Emerg Med Int* 2012;2012:360308.
- [11] Pearlmutter MD, Dwyer KH, Burke LG, Rathlev N, Maranda L, Volturo G. Analysis of emergency department length of stay for mental health patients at Ten Massachusetts Emergency Departments. *Ann Emerg Med* 2017;70:193–202.
- [12] Australian Institute of Health and Welfare. Mental health services in Australia, < <https://www.aihw.gov.au/reports/mental-health-services/mental-health-services-in-australia/report-contents/summary> > ; 2018 [accessed May 22, 2018].
- [13] Chang G, Weiss AP, Orav EJ, Smallwood JA, Gonzalez S, Kosowsky JM, et al. Bottlenecks in the emergency department: the psychiatric clinicians' perspective. *Gen Hosp Psychiatry* 2012;34:403–9.
- [14] Leon SL, Cappelli M, Ali S, Craig W, Curran J, Gokiart R, et al. The current state of mental health services in Canada's paediatric emergency departments. *Paediatr Child Health* 2013;18:81–5.
- [15] Chang G, Weiss AP, Orav EJ, Jones JA, Finn CT, Gitlin DF, et al. Hospital variability in emergency department length of stay for adult patients receiving psychiatric consultation: a prospective study. *Ann Emerg Med* 2011;58:127–36.
- [16] Merelle SYM, Boerema I, van der Linden MC, Gilissen R. Issues in emergency care for people who attempted suicide. *Ned Tijdschr Geneesk* 2018;162.
- [17] Herring A, Wilper A, Himmelstein DU, Woolhandler S, Espinola JA, Brown DF, et al. Increasing length of stay among adult visits to U.S. Emergency departments, 2001–2005. *Acad Emerg Med* 2009;16:609–16.