Author's response to reviews

Title: Screening of mental health and substance users in frequent users of a general Swiss emergency department

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Author's response to reviews: see over
Dear Editor and Reviewers,

Thank you for having reviewed thoroughly our manuscript entitled: Screening of mental health and substance users in frequent users of a general Swiss emergency department.

We are very grateful for the interesting and useful questions, comments and suggestions made by the reviewers that helped improve the quality of our manuscript.

By reviewing thoroughly our manuscript, we noticed errors of transcription regarding the samples of patients:

- The sample consisted of 399 eligible patients. Among them, 389 patients completed the researcher screening.
- The number of ED frequent users who completed the screening was 220 instead of 226
- The number of patients in the control group who completed the screening was 169 instead of 173

We made the corrections throughout the main manuscript, and in all the figures and tables. We reviewed and corrected the flow chart in Figure 1. These changes do not affect the statistical analyses that were performed and they do not change the observations we made.
We modified accordingly the section “Methods” in the abstract as following (lines 13-16 of the revised manuscript): “The sample consisted of 399 eligible adult patients (≥ 18 years old) admitted to the urban, general ED of a University Hospital. Among them, 389 patients completed the researcher screening. Two hundred and twenty frequent users defined by >4 ED visits in the previous twelve months were included and compared to 169 patients with ≤4 ED visits in the same period (control group).”

Modifications made in the “Methods” section of the main manuscript are (lines 71-73 of the revised manuscript):

“The sample consisted of 399 eligible adult patients (≥ 18 years old) admitted to the urban, general ED of a University Hospital. Among them, 389 patients completed the researcher screening. Two hundred and twenty frequent users were compared to 169 patients who used the ED less frequently.”

We took all the reviewers’ commentaries into account and made the necessary modifications to the manuscript as following.

Reviewer #1’s report

Major Compulsory Revisions

1. The use of the term prospective here is somewhat confusing. Please clarify if the current study is using baseline data from an ongoing prospective study, or if this is simply a cross-sectional study with concurrent and retrospective data collection.

Answer: thank you for the comment and the suggestion. We modified accordingly the section “Methods” in the abstract as following (lines 7-16 of the revised manuscript):

“This study is a cross-sectional study with concurrent and retrospective data collection. Between November 2009 and June 2010, patients’ mental health and substance use disorders were identified prospectively in face-to-face research interviews using a screening questionnaire (i.e. researcher screening). These data were compared to the data obtained from a retrospective medical chart review performed in August 2011, searching for mental health and substance use disorders diagnosed by ED physicians and recorded in the patients’ ED medical files (i.e. ED physician diagnosis). The sample consisted of 399 eligible adult patients (≥ 18 years old) admitted to the urban, general ED of a University Hospital. Among them, 389 patients completed the researcher screening. Two hundred and twenty frequent users defined by >4 ED visits in the previous twelve months were included and compared to 169 patients with ≤4 ED visits in the same period (control group).”
Modifications made in the section “Methods” in the main document are (lines 61-68 of the revised manuscript):

“This study is a cross-sectional study with concurrent and retrospective data collection at a University Hospital ED, which handles more than 45,000 ED visits annually. Between November 2009 and June 2010 (i.e. recruitment period), research assistants administered prospectively a screening questionnaire to ED patients included in the study to screen for mental health and substance use disorders and to evaluate patients’ socio-demographic and health-care use characteristics. These data were compared to data obtained from a retrospective medical chart review performed by a researcher in August 2011, searching for mental health and substance use disorders that were diagnosed by the ED physicians and recorded in the electronic medical files at the patients’ ED index visit.”

2. Please include more detail about the sample selection and indicate the proportion of all visits that were identified as frequent users.

Answer: Thank you for the comment. We added a paragraph “Sample and participants” in the section “Methods”, as following (lines 71-83 of the revised manuscript):

“The sample consisted of 399 eligible adult patients (≥ 18 years old) admitted to the urban, general ED of a University Hospital. Among them, 389 patients completed the researcher screening. Two hundred and twenty frequent users were compared to 169 patients who used the ED less frequently.

Frequent users were defined as adult patients having made more than four visits to the ED in the previous 12 months, including the ED index visit (i.e. the ED visit at which the patient was recruited for the study). During the recruitment period, they were automatically identified at their ED admission by using an electronic alert system. Among the 24,277 patients who attended the general ED, 351 patients were identified as frequent users (1.5%). Among the identified frequent users, 125 were excluded for reasons shown in detail in Figure 1 (flow chart). Patients with one to four ED visits within a twelve-month period were randomly selected during the recruitment period using a computerized random number attribution system to comprise the control group.

Patients who attended a specialized ED (paediatric, gynaecologic, or psychiatric), who were under 18 years of age, or who had severe cognitive impairments were excluded from the study.”
3. It is not clear whether data collected during the pilot phase are included in this report.

**Answer:** We added in the section “Methods”, in the paragraph “Study design” (lines 68-69 of the revised manuscript): “[…] A pilot phase took place in October 2009, but data collected during the pilot phase were not included in this report […].”

4. Please include information about how and when patients were recruited for the study.

**Answer:** the recruitment details were completed in the section “Methods”, as following (lines 61-83 of the revised manuscript):

“This study is a cross-sectional study with concurrent and retrospective data collection at a University Hospital ED, which handles more than 45,000 ED visits annually. Between November 2009 and June 2010 (i.e. recruitment period), research assistants administered prospectively a screening questionnaire to ED patients included in the study to screen for mental health and substance use disorders and to evaluate patients’ socio-demographic and health-care use characteristics. These data were compared to data obtained from a retrospective medical chart review performed by a researcher in August 2011, searching for mental health and substance use disorders that were diagnosed by the ED physicians and recorded in the electronic medical files at the patients’ ED index visit. A pilot phase took place in October 2009, but data collected during the pilot phase were not included in this report […]

[...] The sample consisted of 399 eligible adult patients (≥ 18 years old) admitted to the urban, general ED of a University Hospital. Among them, 389 patients completed the researcher screening. Two hundred and twenty frequent users were compared to 169 patients who used the ED less frequently.

Frequent users were defined as adult patients having made more than four visits to the ED in the previous 12 months, including the ED index visit (i.e. the ED visit at which the patient was recruited for the study). During the recruitment period, they were automatically identified at their ED admission by using an electronic alert system. Among the 24,277 patients who attended the general ED, 351 patients were identified as frequent users (1.5%). Among the identified frequent users, 125 were excluded for reasons shown in detail in Figure 1 (flow chart). Patients with one to four ED visits within a twelve-month period were randomly selected during the recruitment period using a computerized random number attribution system to comprise the control group.
Patients who attended a specialized ED (paediatric, gynaecologic, or psychiatric), who were under 18 years of age, or who had severe cognitive impairments were excluded from the study."

5. The article cited for the detailed study protocol is listed as submitted. If the article is not yet published or at least “in press” it is not appropriate to refer the reader to it.

**Answer:** We absolutely agree with the comment. Thank you. As the article cited for the detailed study protocol has recently been accepted for submission, we removed the last sentence in the 1st paragraph in the section “Results”: “All socio-demographic characteristics have been detailed in a separate article”.

We replaced that sentence with a more detailed description of the patients’ socio-demographic characteristics, as following (lines 111-117 of the revised manuscript): “Regarding socio-demographic characteristics, ED frequent users were younger (mean age 51.5, SD 21.5 vs mean age 56.2, SD 22.6, p<0.05) and poorer (household income < CHF 3,000: 39.8% vs 19.7%, p<0.001; unemployed or dependent on welfare: 46.5% vs 15%, p<0.001) compared to the control group. The two groups were comparable regarding gender (female: 45.1% vs 54.9%, p=non-significant) and education (none, incomplete, primary: 30.2% vs 30.1%, p=non-significant; secondary: 51.1% vs 47.4%, p=non-significant; tertiary: 18.7% vs 22.5%, p=non-significant). More details of the socio-demographic characteristics will be presented in a separate article.”

6. Measurements: “For the cross-sectional and prospective study…”: again, it is not clear that there is any prospective data collection involved in this study.

**Answer:** We modified the paragraph “Measurements” in the section “Methods” as following (lines 86-98 of the revised manuscript): “From November 2009 to June 2010, patients’ socio-demographic, medical and health-care use characteristics were gathered prospectively in face-to-face research interviews at the patients’ index ED visit, using a screening questionnaire based on the French versions of several screening instruments which had been validated for use in a primary care setting. Mood-, panic-, and anxiety disorders were assessed using the Primary Care Evaluation of Mental Disorders (Prime-MD) [17]; post-traumatic stress disorder (PTSD) was assessed through specific parts of the Mini-International Neuropsychiatric Interview (M.I.N.I.) [18]; and alcohol and illicit drug use were identified by the Alcohol, Smoking and Substance Involvement Screening Test..."
(ASSIST). Three research assistants (two nurses and one psychologist) were trained during the one month pilot phase to administer the questionnaire to patients.

Retrospectively, we reviewed in August 2011 the medical chart of each patient in order to extract the mental health and substance use disorders diagnosed by ED physicians and recorded in the medical file at the patient’s ED index visit. The extraction of data was performed from the hospital’s electronic file database.

7. Data Analysis, 1st sentence. Table references belong in the results section.

**Answer:** We deleted the first sentence in the paragraph “Data analysis”: “Numbers and percentages for categorical variables are presented in Table 2 and Table 3”.

8. Results, 1st paragraph: Please clarify on what other socio-demographic characteristics the two groups were compared.

**Answer:** We detailed the other socio-demographic characteristics as following (lines 111-117 of the revised manuscript):

“Regarding socio-demographic characteristics, ED frequent users were younger (mean age 51.5, SD 21.5 vs mean age 56.2, SD 22.6, p<0.05) and poorer (household income < CHF 3,000: 39.8% vs 19.7%, p<0.001; unemployed or dependent on welfare: 46.5% vs 15%, p<0.001) compared to the control group. The two groups were comparable regarding gender (female: 45.1% vs 54.9%, p=non-significant) and education (none, incomplete, primary: 30.2% vs 30.1%, p=non-significant; secondary: 51.1% vs 47.4%, p=non-significant; tertiary: 18.7% vs 22.5%, p=non-significant). More details of the socio-demographic characteristics will be presented in a separate article.”

9. Results, 4th paragraph: I found this sentence unclear; please rephrase to clarify that the AOR are for comorbid and psychiatric disorder only groups vs. no disorder. What about the substance use only group?

**Answer:** Thank you for the comment.

We modified the “Results” section of the abstract, as following (lines 21-24 of the revised manuscript):

“Using multiple logistic regression analyses to predict frequent ED use, we found that ED patients who screened positive for psychiatric disorders only and those who
screened positive for both psychiatric and substance use disorders were more likely to be ED frequent users compared to ED patients with no disorder."

We modified the “Results” section of the main document, as following (lines 130-136 of the revised manuscript):

“Using multiple logistic regression analyses to predict frequent ED use, we found that ED patients who screened positive for psychiatric disorders only were more likely to be ED frequent users compared to those with no disorder (adjusted odds ratios [ORs] of 2.6 [95% CI 1.5 to 4.5], p=0.001). Moreover, ED patients who screened positive for both psychiatric and substance use disorders were at higher risk of being ED frequent users compared to those with no disorder (ORs of 4.9 [95% CI 2.6 to 9.1], p<0.001). No difference was found when comparing ED patients who screened positive for substance use disorders only to those with no disorder. ORs were controlled for age and gender.”

The modifications in the “Discussion” section of the main document are as following: “The performed statistical analysis showed that ED patients who screened positive for psychiatric disorders only and those who screened positive for both psychiatric and substance use disorders were more likely to be ED frequent users compared to ED patients with no disorder.” (lines 141-144 of the revised manuscript)

“Regarding whether mental health and substance use disorders may be predictive of a frequent use of ED services, our study showed that patients who screened positive for psychiatric disorders only and those who screened positive for both psychiatric and substance use disorders were at higher risk of visiting an ED frequently (> 4 visits within a twelve-month period) compared to patients with no disorder, regardless of their age or gender. These results seem to concur with observations found in previous studies, as mental health and substance users may seek healthcare in ED services, hypothetically related to their 24 hour availability and accessibility, rather than using community based services whose access may be more limited or more difficult [6, 7]. This seems to be especially true for uninsured patients [6]. The frequent use of EDs may be also the consequence of behavioural or social characteristics in this population of patients that warrant future research to determine the precise underlying mechanisms leading them to use EDs rather than other services [6, 7]. Based on our observations, we could find no explanation on why substance use disorders only were not predictive of a frequent ED use.” (lines 193-204 of the revised manuscript)

The “Conclusion” section was modified, as following (lines 254-256 of the revised manuscript):

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“A predictive factor of the frequent use of ED services by patients was the presence of psychiatric disorders only or the presence of both psychiatric and substance use disorders.”

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**Minor Essential Revisions**

1. Methods, 2nd paragraph: “Research assistants submitted a screening questionnaire…”: I think the authors mean to say “administered” rather than “submitted.” Saying “submitted” makes it sound as if the questionnaire was self-administered. Please revise throughout.

**Answer:** Thank you for the suggestion. We revised throughout the text and we replaced “submitted/submit” with “administered/administer”.

2. Results, 4th paragraph: These are not “psychiatric patients”, but ED patients who screened positive for a psychiatric disorder.

**Answer:** Thank you for the suggestion. We replaced throughout the text “psychiatric patients” with “ED patients who screened positive for psychiatric disorders”.

3. Figure 1: Remove “PTSD: post-traumatic stress disorder” from the figure title

**Answer:** We removed “PTSD: post-traumatic stress disorder” from the Figure 1 title.

4. Discussion, 5th paragraph, line 156: “we found that psychiatric patients…” should be “we found that ED patients who screened positive for a psychiatric disorder…”

**Answer:** Thank you for the suggestion. We replaced throughout the text “psychiatric patients” with “ED patients who screened positive for psychiatric disorders”.

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**Discretionary Revisions**

1. Background: The 2nd-4th sentences of the 1st paragraph seem out of place.

**Answer:** We removed from the original text the 2nd-4th sentences of the 1st paragraph in the section “Background”. We modified the last sentence of the 3rd paragraph in the section “Discussion”, as following (lines 167-170 of the revised manuscript):
“While there is no clear consensus on defining frequent ED use, with thresholds used ranging from two to more than 12 ED visits within a twelve-month period [5], we chose > 4 ED visits within the previous 12 months as a cut-off as it may correspond to non-random events according to Locker et al. [20].”

2. Methods, 2nd paragraph: I suggest placing information about the general design of the study in the first paragraph, before information about the groups.

**Answer:** Thank you for the suggestion. We placed information about the general design of the study (in the paragraph “study design”, lines 60-69 of the revised manuscript) before the information about the groups (in the paragraph “Sample and participants”, lines 70-84 of the revised manuscript).

3. Figures 2 & 3: I would prefer to see proportions rather than numbers.

**Answer:** Thank you for the suggestion. We modified Figures 2 & 3 and showed proportions rather than numbers.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Answer:** Thank you.

**Quality of written English:** Needs some language corrections before being published

**Answer:** The manuscript has been revised by a professional translator.

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Reviewer #2’s report**

**Major Compulsory Revisions**

None

**Minor Essential Revisions**

- Language/grammar
1. ‘submitted’/’submit’ questionnaire- perhaps administer would be better (lines 67, 80)

**Answer:** Thank you. As already suggested by reviewer #1, we revised throughout the text and we replaced “submitted/submit” with “administered/administer”.

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2. Title- shouldn’t give results? Perhaps ‘screening of mental health and substance users in frequent users of a general Swiss emergency department’ would be better.

**Answer:** Thank you for the suggestion. We modified the title of the article as following:

“Screening of mental health and substance users in frequent users of a general Swiss emergency department”

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3. ‘to determine factors predictive’ perhaps state ‘mental health diagnosis or substance misuse disorder diagnosis are predictive’, as factors suggests to me looking at an extensive number of factors (line 5)

**Answer:** Thank you for the suggestion. We modified the objectives in the section “Background” of the abstract, as following (lines 2-6 of the revised manuscript):

“The objectives of this study were to determine the proportions of psychiatric and substance use disorders suffered by emergency departments’ (EDs’) frequent users compared to the mainstream ED population, to evaluate how effectively these disorders were diagnosed in both groups of patients by ED physicians, and to determine if these disorders were predictive of a frequent use of ED services.”

We also modified the last paragraph in the section “Background” of the main text, as following (lines 54-58 of the revised manuscript):

“The objectives of the present study were 1) to determine whether frequent users of an urban and general Swiss University ED had higher proportions of psychiatric and substance use disorders compared to patients who used the ED less frequently, 2) to determine whether those disorders were diagnosed in both groups of patients by ED physicians, and 3) to determine if these disorders were predictive of a frequent use of ED services.”

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4. Lines 14-16- too many ‘or’- replace some with comma. Why have you specified the mental health disorder but not the substance misuse disorder?
Answer: Thank you for the suggestion. We modified the text as following (lines 17-19 of the revised manuscript):
“Researcher screening showed that ED frequent users were more likely than members of the control group to have an anxiety, depressive disorder, post-traumatic stress disorder (PTSD), or suffer from alcohol, illicit drug abuse/addiction.”

5. I wouldn’t start the first sentence of a paragraph, especially as this is the key conclusion, with ‘in addition’ (line 22)

Answer: Thank you for the suggestion. We modified the text as following (lines 25-27 of the revised manuscript):
“This study found high proportions of screened mental health and/or substance use disorders in ED frequent users, but it showed low rates of detection of such disorders in day-to-day ED activities which can be a cause for concern.”

6. ‘In our opinion’- should be subjective, based on the evidence- perhaps re word- ‘In summary’, ‘In conclusion’ ‘Overall the evidence strongly suggests….?’ (line 166)

Answer: Thank you for the suggestion. We modified the text, as following (lines 205-207 of the revised manuscript):
“Overall the evidence strongly suggests that screening the ED frequent user population for mental health and substance use disorders may constitute a relevant intervention due to the significantly higher proportions of these disorders in that group of patients compared to the mainstream ED population.”

7. Don’t need ‘also’ (line 169)

Answer: Thank you for the suggestion. We deleted the word “also” (line 208 of the revised manuscript).

8. Perhaps better wording instead of ‘remain to this day a subject of controversy’ would be ‘warrants future research’ (line 202).

Answer: Thank you for the suggestion. We modified the text as following (lines 258-259 of the revised manuscript):
“Considerations regarding the appropriateness and the feasibility of screening for mental health and substance use disorders in a general ED warrant future research.”
9. Better wording would be- ‘active screening for these disorders among ED frequent users by a case management team could improve the response to the evolving needs of the ED population by helping front-line health-care providers improve the clinical management of ED frequent users.’ (lines 202-206).

**Answer:** Thank you for the suggestion. We modified the text, as following (lines 260-262 of the revised manuscript):

“Nonetheless, active screening for these disorders among ED frequent users by a case-management team could improve the response to the evolving needs of the ED population by helping front-line health-care providers improve the clinical management of ED frequent users.”

**Discretionary Revisions**

- **Clarification**

1. What is a medical chart review?

**Answer:** We extracted mental health and substance use disorders that were diagnosed by ED physicians and recorded in the patients’ electronic medical file. We modified the paragraph “Measurements”, as following (lines 95-98 of the revised manuscript):

“Retrospectively, we reviewed in August 2011 the medical chart of each patient in order to extract the mental health and substance use disorders diagnosed by ED physicians and recorded in the medical file at the patient’s ED index visit. The extraction of data was performed from the hospital’s electronic file database.”

2. What is the index visit?

**Answer:** The ED index visit is the visit at which the patient was recruited for the study. We modified the text in the paragraph “Sample and participants”, as following (lines 74-76 of the revised manuscript):

“Frequent users were defined as adult patients having made more than four visits to the ED in the previous 12 months, including the ED index visit (i.e. the ED visit at which the patient was recruited for the study).”
3. Perhaps state in order to assess the diagnosis rate of mental health disorders and substance misuse disorders you compared ED physician diagnosis in medical files and compared to researcher face-to-face interviews. I feel the aim of the study is getting lost by the description of the method. I am also not clear about the prospective and retrospective data collection methods - when the data was actually collected? - were they not collected at the same time (the index visit) and then the ED physician diagnosis was pulled off the medical records after? If so when was the data collected from the medical records (how retrospective was it?) If this is not the case, it needs to be made clearer. (Abstract-methods lines 9-13).

Answer: Thank you for the comment. As already suggested by reviewer #1, we reworded and completed the paragraph “Study design” in the section “Methods”, as following (lines 61-69 of the revised manuscript):

“This study is a cross-sectional study with concurrent and retrospective data collection at a University Hospital ED, which handles more than 45,000 ED visits annually. Between November 2009 and June 2010 (i.e. recruitment period), research assistants administered prospectively a screening questionnaire to ED patients included in the study to screen for mental health and substance use disorders and to evaluate patients’ socio-demographic and health-care use characteristics. These data were compared to data obtained from a retrospective medical chart review performed by a researcher in August 2011, searching for mental health and substance use disorders that were diagnosed by the ED physicians and recorded in the electronic medical files at the patients’ ED index visit. A pilot phase took place in October 2009, but data collected during the pilot phase were not included in this report.”

4. 16-18- perhaps reword- ‘the medical chart review showed’...- to something like ‘comparisons between ED physician diagnosis and researcher screened diagnosis indicated’.... At the moment you have no comparison- until understanding your method I wondered how the mental health diagnosis and substance use disorders in frequent ED users and control group were low compared to what- it is not clear that ED physician diagnosis were low in both groups compared to researcher screened diagnosis.

Answer: Thank you for the comment.
We reworded the text in the section “Results” of the abstract, as following (lines 17-21 of the revised manuscript):

“Researcher screening showed that ED frequent users were more likely than members of the control group to have an anxiety, depressive disorder, post-traumatic stress disorder (PTSD), or suffer from alcohol, illicit drug abuse/addiction. Reviewing
the ED physician diagnosis, we found that the proportions of mental health and substance use disorders diagnosed by ED physicians were low both among ED frequent users and in the control group.”

We reworded the text in the section “Results” of the main manuscript, as following (lines 118-123 of the revised manuscript):
“Researcher screening showed that ED frequent users had higher proportions of mental health and substance use disorders compared to patients who used the ED less frequently, as shown in detail in Table 1, Table 2 and Table 3.

Reviewing the ED physician diagnosis, we found that the proportions of mental health and substance use disorders diagnosed by ED physicians at the patients’ ED index visit were low in both ED frequent users and the control group, as shown in detail in Figure 2 and Figure 3.”

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5. A definition of what you consider to be a psychiatric patient would be useful.

**Answer:** Thank you for the comment. We misused the words “psychiatric patients” to refer to ED patients who screened positive for psychiatric disorders. We reworded and replaced throughout the text “psychiatric patients” by “patients who screened positive for psychiatric disorders”.

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- **Background**

6. 41- Why do mental health and substance use issues often lead patients to seek care from ED health-care providers? Why does more than one diagnosis increase ED use even more? Some context and expansion would be useful (line 41-44)

**Answer:** Thank you for the comment. We modified and completed the 2nd paragraph in the section “Background”, as following (lines 38-45 of the revised manuscript):
“Mental health and substance use issues often lead patients to seek care from ED health-care providers, hypothetically as a result of multiple factors: the 24 hour availability and accessibility of ED services, the deinstitutionalization of patients, the insufficient resources or funding for community based psychiatric and substance misuse services [6, 7]. Moreover, some authors found that patients cumulating both psychiatric and substance use disorders were more likely to visit the ED compared to patients with one disorder alone (with adjusted odds ratios ranging from 2.8 to 5.6 depending on the primary disorders and the cut-off used for defining frequent ED
use), although the available data did not prove the strict designation of causality [8, 9]."

7. Could give more details and explanation of why you are comparing frequent ED users to less frequent ED users (lines 45-50).

**Answer:** Thank you for the comment. We modified the section “Background”, as following (lines 46-49 of the revised manuscript):

“Compared to the ED mainstream population, ED frequent users are of particular interest because of the higher proportions of mental health and substance use disorders reported in previous studies in the latter group of patients [10-13]. Moreover, early detection of these disorders is key if appropriate inpatient and community-based interventions are to be provided.”

- **Methods**

8. How was the experimental and control group recruited? What sampling method? Brief description would allow the reader to judge if bias could have been introduced in this way (line 64)

**Answer:** as already requested by reviewer #1, the recruitment details were added/completed in the paragraph “Sample and participants” in the section “Methods” (lines 74-81 of the revised manuscript):

“Frequent users were defined as adult patients having made more than four visits to the ED in the previous 12 months, including the ED index visit (i.e. the ED visit at which the patient was recruited for the study). During the recruitment period, they were automatically identified at their ED admission by using an electronic alert system. Among the 24,277 patients who attended the general ED, 351 patients were identified as frequent users (1.5%). Among the identified frequent users, 125 were excluded for reasons shown in detail in Figure 1 (flow chart). Patients with one to four ED visits within a twelve-month period were randomly selected during the recruitment period using a computerized random number attribution system to comprise the control group.”

9. I feel more details and justification are needed for the retrospective and prospective data collection. After reading the whole paper and figures I now understand that what you are actually comparing is researchers screening results
and physicians diagnosis- perhaps the method of collection (i.e. retrospective vs. prospective) should be clearly stated in the methods, and then the focus should be on what is actually being measured.

**Answer:** as already requested by reviewer #1, we modified accordingly the section “Methods” in the abstract, as following (lines 7-16 of the revised manuscript):

“This study is a cross-sectional study with concurrent and retrospective data collection. Between November 2009 and June 2010, patients’ mental health and substance use disorders were identified prospectively in face-to-face research interviews using a screening questionnaire (i.e. researcher screening). These data were compared to the data obtained from a retrospective medical chart review performed in August 2011, searching for mental health and substance use disorders diagnosed by ED physicians and recorded in the patients’ ED medical files (i.e. ED physician diagnosis). The sample consisted of 399 eligible adult patients (≥ 18 years old) admitted to the urban, general ED of a University Hospital. Among them, 389 patients completed the researcher screening. Two hundred and twenty frequent users defined by >4 ED visits in the previous twelve months were included and compared to 169 patients with ≤4 ED visits in the same period (control group).”

Modifications made in the section “Methods” in the main document are (lines 61-69 of the revised manuscript):

“This study is a cross-sectional study with concurrent and retrospective data collection at a University Hospital ED, which handles more than 45,000 ED visits annually. Between November 2009 and June 2010 (i.e. recruitment period), research assistants administered prospectively a screening questionnaire to ED patients included in the study to screen for mental health and substance use disorders and to evaluate patients’ socio-demographic and health-care use characteristics. These data were compared to data obtained from a retrospective medical chart review performed by a researcher in August 2011, searching for mental health and substance use disorders that were diagnosed by the ED physicians and recorded in the electronic medical files at the patients’ ED index visit. A pilot phase took place in October 2009, but data collected during the pilot phase were not included in this report.”

10. More details about the researcher screening (retrospective) and physician diagnosis (prospective) would be useful- i.e. were they both measured at the same time (on the index visit- not sure exactly what this is), although the physician diagnosis was collected by researchers at a later time retrospectively from records? Why did you choose to collect physician diagnosis in this way- to reflect true diagnosis being made? Justify measurements and method. Is it an easier method
than asking the physician to complete a survey? Is there any disadvantages and advantages in using face to face interviews vs. extracting information from medical records that should be discussed in limitations- are they accurately comparable? (lines 9-13, 62-71)

**Answer:** Thank you for the comment. Regarding the methods, modifications that were made to the text are reported in the previous comment (#9).

We also made corrections in the paragraph “Limitations” in the section “Discussion”, as following (lines 237-245 of the revised manuscript):

“To collect the ED physicians’ mental health and substance misuse diagnoses, we chose to review the patients’ electronic medical files because it was an easier and less time-consuming method rather than asking the ED physicians to complete a survey or to administer themselves the screening questionnaire to the patients. This method of collection allowed the reflection of the true diagnostic process used by ED physicians in their day-to-day activities. Another advantage is the avoidance of recall biases that may be observed when surveys are performed [26]. A disadvantage of the collection method we used is that mental health and substance use disorders may have been previously known of, suspected, or identified by ED physicians but not recorded in the medical files at the ED index visit. Therefore, clinically diagnosed mental health and substance use disorders may have been underestimated in our results.”

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11. What demographic and medical characteristics were measured? Why not state which measures were used? (lines 73-75)

**Answer:** As already requested by reviewer #1, we detailed the other socio-demographic characteristics, as following (lines 111-117 of the revised manuscript):

“Regarding socio-demographic characteristics, ED frequent users were younger (mean age 51.5, SD 21.5 vs mean age 56.2, SD 22.6, \( p<0.05 \)) and poorer (household income < CHF 3,000: 39.8% vs 19.7%, \( p<0.001 \); unemployed or dependent on welfare: 46.5% vs 15%, \( p<0.001 \)) compared to the control group. The two groups were comparable regarding gender (female: 45.1% vs 54.9%, \( p=\text{non-significant} \)) and education (none, incomplete, primary: 30.2% vs 30.1%, \( p=\text{non-significant} \); secondary: 51.1% vs 47.4%, \( p=\text{non-significant} \); tertiary: 18.7% vs 22.5%, \( p=\text{non-significant} \)). More details of the socio-demographic characteristics will be presented in a separate article.”

The health-care use characteristics refer to the frequent use of ED services by patients.
12. Why have you subdivided psychiatric patients into those with and without a substance misuse disorder? I think it would be clearer to simply state that psychiatric patients were more likely to be ED frequent users compared to those without a psychiatric diagnosis. If you have found an interesting difference between psychiatric patients with a substance misuse disorder and psychiatric patients without a substance misuse disorder you can state in abstract, if not simply state no differences were found in the results section and you can compare psychiatric patients as whole group (lines 18-21, 113-117)

**Answer:** Thank you for the comment.

As already suggested by reviewer #1, we modified the “Results” section of the abstract, as following (lines 21-24 of the revised manuscript):

“Using multiple logistic regression analyses to predict frequent ED use, we found that ED patients who screened positive for psychiatric disorders only and those who screened positive for both psychiatric and substance use disorders were more likely to be ED frequent users compared to ED patients with no disorder.”

We modified the “Results” section of the main document, as following (lines 130-136 of the revised manuscript):

“Using multiple logistic regression analyses to predict frequent ED use, we found that ED patients who screened positive for psychiatric disorders only were more likely to be ED frequent users compared to those with no disorder (adjusted odds ratios [ORs] of 2.6 [95% CI 1.5 to 4.5], p=0.001). Moreover, ED patients who screened positive for both psychiatric and substance use disorders were at higher risk of being ED frequent users compared to those with no disorder (ORs of 4.9 [95% CI 2.6 to 9.1], p<0.001). No difference was found when comparing ED patients who screened positive for substance use disorders only to those with no disorder. ORs were controlled for age and gender.”

The modifications in the “Discussion” section of the main document are as following: “The performed statistical analysis showed that ED patients who screened positive for psychiatric disorders only and those who screened positive for both psychiatric and substance use disorders were more likely to be ED frequent users compared to ED patients with no disorder.” (lines 141-144 of the revised manuscript)

“Regarding whether mental health and substance use disorders may be predictive of a frequent use of ED services, our study showed that patients who screened positive for psychiatric disorders only and those who screened positive for both psychiatric and substance use disorders were at higher risk of visiting an ED frequently (> 4 visits within a twelve-month period) compared to patients with no disorder,
regardless of their age or gender. These results seem to concur with observations found in previous studies, as mental health and substance users may seek healthcare in ED services, hypothetically related to their 24 hour availability and accessibility, rather than using community based services whose access may be more limited or more difficult [6, 7]. This seems to be especially true for uninsured patients [6]. The frequent use of EDs may be also the consequence of behavioural or social characteristics in this population of patients that warrant future research to determine the precise underlying mechanisms leading them to use EDs rather than other services [6, 7]. Based on our observations, we could find no explanation on why substance use disorders only were not predictive of a frequent ED use.” (lines 193-204 of the revised manuscript)

The “Conclusion” section was modified, as following (lines 254-256 of the revised manuscript):

“A predictive factor of the frequent use of ED services by patients was the presence of psychiatric disorders only or the presence of both psychiatric and substance use disorders.”

13. Why did you classify the main complaints into 3 category’s? (85-88). Did you do any analyses with this?

**Answer:** Thank you for the question. As clinicians, it is useful to distinguish psychiatric related complaints from the somatic or the non-specific complaints. It can lead to a different clinical management by specific healthcare teams depending on the patient’s main complaints. Also, since we found in our study higher proportions of patients positively screened for mental health and substance use disorders in ED frequent users compared to the control group, we were interested to know if we would have a similar observation with the patients’ main complaints.

We reported our observations in our results (lines 126-129 of the revised manuscript), as following: “We also found that ED frequent users were more likely to make an ED visit for mental health and substance use-related main complaints compared to the control group (Chi$$^2$$ (1)=12.12, p<0.001, missing data for 27 ED frequent users and 35 patients in the control group). No difference was found regarding somatic and non-specific main complaints.”

14. More details about analyses of qualitative data and analyses needed (lines 90-92)

**Answer:** Thank you for the comment. By “qualitative data” (line 104 of the revised document) we meant nominal and ordinal data.
**Analyses**

15. A table comparing socio-demographic and medical characteristics between your frequent ED and control group would be useful. Are groups similar and thus allow valid comparisons? Summary would be useful even though more detailed information is given in a separate article (98-101)

**Answer:** As already requested by reviewer #1, we detailed the other socio-demographic characteristics in a summary, as following (line 111-117 of the revised document):

“Regarding socio-demographic characteristics, ED frequent users were younger (mean age 51.5, SD 21.5 vs mean age 56.2, SD 22.6, p<0.05) and poorer (household income < CHF 3,000: 39.8% vs 19.7%, p<0.001; unemployed or dependent on welfare: 46.5% vs 15%, p<0.001) compared to the control group. The two groups were comparable regarding gender (female: 45.1% vs 54.9%, p=non-significant) and education (none, incomplete, primary: 30.2% vs 30.1%, p=non-significant; secondary: 51.1% vs 47.4%, p=non-significant; tertiary: 18.7% vs 22.5%, p=non-significant). More details of the socio-demographic characteristics will be presented in a separate article.”

16. Is 21.5-56.2 the range? If so is it necessary to report? Confidence interval rather than SD and p value would be useful (lines 98-99)

**Answer:** Thank you for the question. We mistakenly forgot to mention “mean age” before the “56.2” value. The sentence was reworded, as following (line 111-113 of the revised document):

“Regarding socio-demographic characteristics, ED frequent users were younger (mean age 51.5, SD 21.5 vs mean age 56.2, SD 22.6, p<0.05) and poorer (household income < CHF 3,000: 39.8% vs 19.7%, p<0.001; unemployed or dependent on welfare: 46.5% vs 15%, p<0.001) compared to the control group.”

17. Would be good to compare psychiatric patients vs patients without psychiatric diagnosis before moving on to examine differences between specific psychiatric diagnosis (figure 2). In the text would be good to make the results (researcher screening vs. ED physician diagnosis) from figure 2 clearer, and what your interpretation is of these results.
Answer: Thank your for the comment and suggestion. We added supplementary data in Table 1 including the comparison between ED frequent users vs control group regarding the disorders they were screened positive for (patients with no disorder, those with psychiatric disorders only, those with substance use disorders only and those with both psychiatric and substance use disorders). We relabeled the former Table 1 and Table 2 into Table 2 and Table 3.

We modified the text in the “Discussion” section, as following: (lines 145-149 of the revised manuscript)

“Regarding the researcher screening, we found higher proportions of mental health and substance use disorders in ED frequent users compared to the ED mainstream population (no disorder: 35% vs 67%, mental health disorders only: 31% vs 22%, substance use disorders only: 10% vs 6%, both mental health and substance use disorders: 25% vs 8%; Chi²(3)=42.97, p<0.001). Previous studies have reported similar observations in the UK [13], in the USA [12] and in Canada [11].”

**Results**

18. Figure 2 labels- why have you labelled researcher screening with measure used, but ED physician diagnosis as it is? Either label as screening (researcher diagnosis) vs. ED physician diagnosis or label both groups with measure used- did the ED physician use the same measurement to make diagnosis? Again aim of comparison is lost in graph.

Answer: Thank you for the suggestion. We reworded the 2nd paragraph in the section “Results”, as following (line 118-120 of the revised document):

“Researcher screening showed that ED frequent users had higher proportions of mental health and substance use disorders compared to patients who used the ED less frequently, as shown in detail in Table 1, Table 2 and Table 3.”

We reworded the titles in Table 2 and Table 3, as following:

“Table 2. Mental health disorders screened by researcher in ED frequent users compared to the control group.”

“Table 3. Substance use disorders screened by researcher in ED frequent users compared to the control group.”
We reworded the titles in Figure 2 and Figure 3, as following:

“Figure 2. Mental health disorders in ED frequent users and in the control group: researcher screening vs ED physician diagnosis.”

“Figure 3. Substance use disorders in ED frequent users and in the control group: researcher screening vs ED physician diagnosis.”

In Figure 1, we replaced:

- “PRIME-MD, M.I.N.I., and ASSIST screening” by “Researcher screening”
- “ED physician’s evaluation” by “ED physician diagnosis”

In Figure 2 and Figure 3, we replaced:

- “PRIME-MD/M.I.N.I. identified disorders” by “Researcher screening”,
- “Mental health disorders diagnosed by ED physicians” by “ED physician diagnosis”
- “ASSIST identified disorders” by “Researcher screening”,
- “Substance use disorders diagnosed by ED physicians” by “ED physician diagnosis”

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**Discussion**

1. The step by step nature of your analyses, and thus your interpretations, are not clear. What exactly can you conclude about the relationship between your variables. Summarise the findings from this study, structuring and matching up to your aims and objectives. You have not addressed the objectives (lines 51-54) in the discussion.

**Answer:** Thank you for the comment. We completed and modified the 1st and the 2nd paragraphs of the section “Discussion”, as following (lines 138-149 of the revised manuscript):

“In this study, researcher screening showed that ED frequent users had higher proportions of mental health and substance use disorders compared to patients who used the ED less frequently. Reviewing the ED physician diagnosis, we found that the proportions of these disorders diagnosed by ED physicians were low both among ED frequent users and in the control group. The performed statistical analysis showed that ED patients who screened positive for psychiatric disorders only and
those who screened positive for both psychiatric and substance use disorders were more likely to be ED frequent users compared to ED patients with no disorder.

Regarding the researcher screening, we found higher proportions of mental health and substance use disorders in ED frequent users compared to the ED mainstream population (no disorder: 35% vs 67%, mental health disorders only: 31% vs 22%, substance use disorders only: 10% vs 6%, both mental health and substance use disorders: 25% vs 8%; Chi^2(3)=42.97, p<0.001). Previous studies have reported similar observations in the UK [13], in the USA [12] and in Canada [11].”

We also added in the section “Discussion” (lines 193-204 of the revised manuscript):

“Regarding whether mental health and substance use disorders may be predictive of a frequent use of ED services, our study showed that patients who screened positive for psychiatric disorders only and those who screened positive for both psychiatric and substance use disorders were at higher risk of visiting an ED frequently (> 4 visits within a twelve-month period) compared to patients with no disorder, regardless of their age or gender. These results seem to concur with observations found in previous studies, as mental health and substance users may seek health-care in ED services, hypothetically related to their 24 hour availability and accessibility, rather than using community based services whose access may be more limited or more difficult [6, 7]. This seems to be especially true for uninsured patients [6]. The frequent use of EDs may be also the consequence of behavioural or social characteristics in this population of patients that warrant future research to determine the precise underlying mechanisms leading them to use EDs rather than other services [6, 7]. Based on our observations, we could find no explanation on why substance use disorders only were not predictive of a frequent ED use.”

2. ‘In this study, ED frequent users had higher proportions of mental health and substance use disorders compared to patients who used the ED less frequently.’- how much more likely? You have gone on to report other studies findings without giving your findings - the reader is not able to make a comparison (lines 119-125). Again, for this reason, it would be useful for you to compare psychiatric patients and substance abuse (without being sub divided into disorders) in ED frequent users to less frequent ED users.

**Answer:** Thank you for the comment. We modified the 2nd paragraphs of the section “Discussion”, as following (lines 145-149 of the revised manuscript):

“Regarding the researcher screening, we found higher proportions of mental health and substance use disorders in ED frequent users compared to the ED mainstream
population (no disorder: 35% vs 67%, mental health disorders only: 31% vs 22%, substance use disorders only: 10% vs 6%, both mental health and substance use disorders: 25% vs 8%; \( \chi^2(3)=42.97, p<0.001 \)). Previous studies have reported similar observations in the UK [13], in the USA [12] and in Canada [11]."

3. The objective to examine predictors of frequent ED use has been lost- if the factors you examined did not predict frequent ED use, it is just as important to report this throughout the paper and especially in the discussion. Why do you think you did not find evidence to support this?

**Answer:** Thank you for the comment. We added in the section “Discussion” (lines 193-204 of the revised manuscript):

“Regarding whether mental health and substance use disorders may be predictive of a frequent use of ED services, our study showed that patients who screened positive for psychiatric disorders only and those who screened positive for both psychiatric and substance use disorders were at higher risk of visiting an ED frequently (> 4 visits within a twelve-month period) compared to patients with no disorder, regardless of their age or gender. These results seem to concur with observations found in previous studies, as mental health and substance users may seek health-care in ED services, hypothetically related to their 24 hour availability and accessibility, rather than using community based services whose access may be more limited or more difficult [6, 7]. This seems to be especially true for uninsured patients [6]. The frequent use of EDs may be also the consequence of behavioural or social characteristics in this population of patients that warrant future research to determine the precise underlying mechanisms leading them to use EDs rather than other services [6, 7]. Based on our observations, we could find no explanation on why substance use disorders only were not predictive of a frequent ED use.”

4. Would be useful to explore the implications of your findings further. In the abstract (lines 24-26) a solution is offered, perhaps in discussion expand on this and why this would be an effective strategy (evidence base) (lines 175-180). Define case management, and what is the mechanism by which frequent ED attendance could be reduced?

**Answer:** Thank you for the comment. We expanded the section “Discussion” with a brief description of the case management team we implemented in our local hospital and reworded the text, as following (lines 205-233 of the revised manuscript):

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“Overall the evidence strongly suggests that screening the ED frequent user population for mental health and substance use disorders may constitute a relevant intervention due to the significantly higher proportions of these disorders in that group of patients compared to the mainstream ED population. Furthermore, such an intervention may help identify ED patients with silent disorders that could be dealt with if diagnosed [14-16]. In 2004, 5% of the general Swiss population had a depression- or bipolar disorder, 10% an anxiety disorder, 0.5% a psychotic disorder, and 2% an addiction (illicit drug or alcohol) disorder [23]. Psychiatric and substance use problems generated an estimated overall cost of more than 11 billion Swiss francs per year mainly made up of indirect costs such as those related to absenteeism or early retirement [24].

However, as mentioned earlier, EDs may not have the resources needed to implement an active screening of mental health and substance use disorders in ED frequent users, nor to provide the following steps if disorders were to be identified such as referring patients to community based services, insuring their access to outpatient treatments, etc. In this perspective, the intervention of a case management team could help front-line health-care providers in improving the clinical management of this group of patients by performing such an active screening. US case management programs have shown significant benefits for the management of ED frequent users by improving their clinical and social outcomes as well as reducing their ED use and, hence, ED costs [25] and our local University Hospital implemented such a case management program in 2009, as fitted the reality on the ground [10]. The case management team in our program consisted of nurses who worked under the supervision of general practitioners and who acquired clinical skills (such as motivational interviewing skills, transcultural communication skills, etc.) that helped ED health-care providers respond to the patients’ medical and social needs. Interventions made by our case managers were, for instance, to refer patients to the appropriate primary care services, to improve communication and collaboration within their healthcare and social network, to provide them general health counselling. To assess the clinical and economical impact of such an intervention, we started in April 2012 a randomized controlled trial in our local hospital with results being processed at the moment.

A future development of screening instruments for mental health and substance use disorders adapted to the ED setting may be of particular interest for our case management team to improve the detection of such disorders in the ED frequent users population.”
5. As psychiatric conditions are more frequent in ED users, if screening across all patients is not feasible, would mental health screening be especially justified in frequent ED users? (lines 146-169). This point could be made clearer, currently broken up and not clear/summarised.

**Answer:** Thank you for the comment. As mentioned in the previous comment (#4), we expanded and rewroded the section “Discussion”. We hope the point would be clearer that way.

6. Is there any evidence/ could you model costs/burden of frequent ED attenders vs. less frequent ED attenders (lines 172-173).

**Answer:** Thank you for the question. As mentioned in the discussion, “US case management programs have shown significant benefits for the management of ED frequent users by improving their clinical and social outcomes as well as reducing their ED use and, hence, ED costs [25]”. We hope to provide some answers on our local scale with a randomized controlled trial we initiated in 2012 to evaluate the intervention of a case-management team in ED frequent users. We reworded the text, as following (lines 228-230 of the revised manuscript):

“To assess the clinical and economical impact of such an intervention, we started in April 2012 a randomized controlled trial in our local hospital with results being processed at the moment.”

Yours sincerely,

Patrick Bodenmann
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Senior Faculty

Francis Vu
Senior resident, MD candidate