A simple prognostic score predicts one-year mortality of alert and calm emergency department patients

A prospective two-center observational study

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Published in:
International Journal of Clinical Practice

DOI:
10.1111/ijcp.13481

Publication date:
2020

Document version:
Accepted manuscript

Citation for published version (APA):

Go to publication entry in University of Southern Denmark's Research Portal

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A Simple Prognostic Score Predicts One-Year Mortality of Alert and Calm Emergency Department Patients: a Prospective Two-Center Observational Study

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Running title: Simple Prognostic Score for Emergency Departments

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This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the Version of Record. Please cite this article as doi: 10.1111/IJCP.13481

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Key words: prognosis, emergencies, prognostic score, emergency department, one-year mortality, impaired mobility, vital signs

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Funding and Conflict of interest statement
All costs were borne by the authors. John Kellett is a major shareholder, director and chief medical officer of Tapa Healthcare DAC. The other authors have no potential conflicts of interest.
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Article type: Original Paper

Abstract

Study Objective: derive and validate a prognostic score to predict one-year mortality using vital signs, mobility and other variables that are readily available at the bedside at no additional cost.

Methods: post-hoc analysis of two independent prospective observational studies in two emergency departments, one in Denmark and the other in Switzerland.

Participants: alert and calm emergency department patients

Measurements: the prediction of mortality from presentation to 365 days by vital signs, mobility and other variables that are readily available at the bedside at no additional cost.

Results: 1,618 alert and calm patients were in the Danish cohort and 1,331 in the Swiss cohort. Logistic regression identified age >68 years, abnormal vital signs, impaired mobility and the decision to admit as significant predictors of 365-day mortality. A simple prognostic score awarded one point to each of these predictors. Less than two of these predictors were present in 45.6% of patients, and only 0.4% of these patients died within a year. If two or more of these predictors were present, 365-day mortality increased exponentially.

Conclusion: Age >68 years, the decision for hospital admission, any vital sign abnormality at presentation and impaired mobility at presentation are equally powerful predictors of one-year mortality in alert and calm emergency department

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patients. If validated by others these predictors could be used to discharge patients with confidence since nearly half these patients had less than two predictors and none of them died within 30 days. However, when two or more predictors were present 365-day mortality increased exponentially.

Funding: All costs were borne by the authors.

Key words: prognosis, emergencies, prognostic score, emergency department, one-year mortality, impaired mobility, vital signs

What is already known about this topic?
The mortality rates of patients discharged from emergency departments are infrequently reported and range from 0.1% to 0.2% within 7 to 30-days.

What does this article add?
This study shows that a prognostic score based on readily available data identify patients with both a good and poor outcome. The chance that an emergency department patient with normal vital signs and mobility will die within a year is negligible, even if they are older and/or admitted to hospital.

Introduction

Background:
Emergency admissions to hospital are increasing and there are fewer beds to accommodate them. However, does every patient admitted to hospital need to be admitted? No emergency physician wants to hear that a patient he or she discharged from the emergency department (ED) a few days ago has died, as this patient may well be a victim of a medical error. The decisions to admit or discharge patients are often not made by explicit evidence-based criteria, show considerable variation, and many patients admitted to hospital have normal or near normal vital signs [1]. Little had been published on what happens to patients discharged from emergency departments, and reports range from a 0.1% chance of unexpected mortality within 7 days [2] to a 30-day mortality of 0.2% [3]. Reliable prognostication, therefore, is an
essential component of emergency care. Wise management, especially of those older patients with supportive and palliative care needs, is impossible without considering their likely prognosis [4,5]. Furthermore, if it were possible to identify with certainty patients who were safe to discharge this would eliminate many of the risks of hospitalization (e.g. de-conditioning, delirium, hospital acquired infection, falls, pressure sores, poly-pharmacy, etc), liberate limited hospital resources, reduce healthcare costs, and be preferred by many patients [1].

Importance:
There is a need for a simple system at the ED “front door” to determine who is likely to die in the foreseeable future, who is likely to benefit from immediate interventions, and who can or should be treated later and elsewhere. A modification of the CriSTAL prognostic model has recently been suggested for the assessment of frail older ED patients [6]. However, it is clearly not practical to use complex or inconvenient scores [7-9], or those that require laboratory information [10,11], or access to large amounts of administrative data [12, 13] on every patient attending an ED. The question “Would you be surprised if this patient died within the next 6 to 12 months?” has been suggested as a trigger for referral to specialist palliative care [14,15]. However, the accuracy of this “surprise question” varies considerably, and it is not clear if it is a cost-effective way of identifying those in need of supportive and palliative care services [16]. A recent report [17] has shown that the “surprise question” maybe useful to rule in mortality risk as it had a high specificity, but it cannot be used to rule out mortality as it was found to have a low sensitivity and was only tested in older ED patients.

Goals of this investigation:
In this analysis of two prospective observational multi-center studies, we aimed to develop and validate a prognostic score to predict mortality up to one year after presentation using vital signs and other variables that are readily available at the bedside at no additional cost in alert and calm patients attending two different emergency departments in Denmark and Switzerland.

Methods
Study design and setting
A post-hoc analysis of two independent prospective observational studies carried out in two different countries according to the STROBE guidelines [18]. The Hospital of South West Jutland in Esbjerg, Denmark, is a 450-bed regional teaching hospital that serves approximately 220,000 inhabitants. Medical patients are referred to the ED by general practitioners (GP), outpatient clinics, out-of-hours GP service and emergency medical services.

The University Hospital of Basel is a 700-bed academic tertiary care center in North western Switzerland with an ED census of over 50,000 patients per year. It takes care of all patients except for obstetric, pediatric and ophthalmologic patients, who are treated elsewhere. Many patients are self-referred and have not been assessed by a clinician prior to presenting to the ED.

Selection of Participants
In order to exclude the influence of altered mental status on impaired mobility this study only included patients who were alert and calm on presentation. All participants were acute presentations aged 18 years or older. In both cohorts, patients could only be included in the study once: only the assessment on first presentation was used for any patients who subsequently re-presented.

Data collection
Patients with a National Early Warning Score (NEWS) of zero were deemed to have normal vital signs since these values have the lowest association with death within 24 hours [19] and are consistent with current single parameter “track and trigger” systems [20]. Impaired mobility on presentation (IMOP) was defined in both cohorts as lack of a stable independent gait when first assessed [21]. Therefore, any patients that were unsteady on their feet, needed a walking stick or other aid to steady themselves, needed help to walk, or were bedridden were considered to have IMOP. It was not considered whether IMOP was acute, temporary or permanent.

Mobility was systematically assessed in both cohorts and vital signs were documented for all included patients. In both cohorts, triage clinicians who were unaware of the...
purpose of the study, routinely collected vital signs and assessed mobility shortly after presentation to the ED.

The Esbjerg cohort was recruited between April 24 and August 19, 2017 as part of a separate ongoing study [ClinicalTrials.gov, Identifier: NCT03108807]. It included all patients who required blood to be drawn on a clinical indication on arrival to the hospital's ED and who gave written informed consent to participate in the study. Three trained research assistants performed the screening and inclusion processes 7 days a week, but for administrative reasons it was not possible to include patients admitted between 10 pm and 1 am.

The Basel cohort was derived from an all-comer quality control study of 2,304 alert and calm patients who presented to the ED during a 3-week period (January 30 to February 19, 2017). Study personnel, available 24 hours a day and 7 days a week, entered additional information, such as disposition, into machine-readable case report forms. Patients with incomplete vital signs and those lost to follow-up were excluded from the analysis.

Outcomes
For the Esbjerg cohort, 365-day mortality data were extracted from the Danish Civil Registration System for all patients to secure complete follow-up [22]. For the Basel cohort, 365-day mortality data were extracted from the electronic health record (EHR) or collected from the cantonal civil registry, health insurance databases and telephonic interviews with patients and family physicians.

Statistical methods
Calculations were performed using Epi-Info version 6.0 (Centre for Disease Control and Prevention, USA) and R version 3.3.2 (https://www.Rproject.org/). Numeric variables were compared using Student’s t-test and categorical variables were compared using Chi square analysis with Yates continuity correction when applicable. Continuous variables were dichotomized defining their optimal cut-off using the highest Chi-square value for one-year mortality. Logistic regression analysis was performed using Logistic software [23]. Survival analysis was performed using the Online Application for the Survival Analysis software (OASIS) available at

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Kaplan–Meier survival curves were compared by the log-rank test. The p value for statistical significance was 0.05.

Derivation and validation of a prediction model
Candidate variables were initially explored by multivariate logistic regression analysis in both cohorts combined. Those variables that were identified as statistically significant predictors were then used to derive the predictive model in the derivation cohort (Esbjerg). Model calibration was assessed using the Hosmer-Lemeshow statistic. The model was validated in the Basel cohort using the c-statistic.

Ethics
The original study, from which the data of the Esbjerg cohort was obtained, was approved by the Danish Regional Committee of Health Research Ethics (Identifier: S-20170005) and the Danish Data Protection Agency (Identifier: Region Syddanmark 2452).

Ethical approval of the Basel cohort was obtained by the local ethics committee (identifier 236/13, www.eknz.ch). The need for written informed consent was waived. Patients were excluded if they actively declined participation or the EHR contained a general rejection to participation in research.

Results
Characteristics of study population:
There were 1,618 alert patients in the Esbjerg cohort, all of whom were followed-up for 365 days after their first presentation to the ED. Out of the Basel cohort of 2,304 alert and calm patients, 975 (42%) patients did not have a complete set of vital signs recorded and were excluded from the study. Although these patients had the same age, hospital admission rate, and 30, 100 and 365-day mortality, less were men (48% versus 53%, p 0.04), more had an impaired gait (38% versus 28%, p <0.0001), more were Emergency Severity Index (ESI) of 1 (2.8% versus 1.1%, p 0.004) and fewer were ESI 4 (27.3% versus 33.4%, p 0.002) compared to those in whom a complete set of vital signs was recorded. Of the 1381 (60%) patients who had a complete set of vital signs recorded 50 (3.6%) were lost to follow-up, yielding a final study population of 1331 patients.
The Esbjerg cohort was older than the Basel cohort (63.0 SD 18.2, range 18 to 97 years versus 52.6 SD 21.6, range 18 to 100 years, p <0.0001), and had a higher NEWS on presentation (1.6 SD 2.0 versus 1.4 SD 1.7, p 0.02). Nearly all the Esbjerg patients (98.8%) were deemed to be medical compared with only 50.4% of those from Basel. The Esbjerg patients were also more likely to be admitted to hospital, more likely to have IMOP, and more likely to die within 365 days than those in Basel. However, this difference in the mortality became insignificant if hospital admission was accounted for. The Basel patients were more likely to have abnormal vital signs on presentation than those in Esbjerg (Table 1). Patients admitted to hospital in Basel had a slightly shorter length of stay than those in Esbjerg, but this failed to reach statistical significance (2.6 SD 5.3 versus 3.0 SD 7.2 days, p 0.09).

Determining the predictors of mortality by univariate analysis of the combined data of both cohorts

Patients who died within 365 days were significantly older than survivors (75.8 SD 12.8 versus 57.1 SD 20.3 years, p <0.0001), and NEWS on presentation was significantly higher in those who died compared with survivors (3.0 SD 2.7 versus 1.4 SD 2.0 p <0.0001). Medical patients, patients admitted to hospital, those with abnormal vital signs on presentation, and those with IMOP were more likely to die (Table 2). Patients admitted to hospital that died within 365 days also had a longer length of hospital stay than survivors (7.5 SD 8.2 versus 2.5 SD 6.2 days, p <0.0001).

Significant predictors of one-year mortality in both cohorts by multivariate analysis

Logistic regression of both cohorts combined identified age as a continuous variable, normal vital signs, IMOP and the decision to admit as significant predictors of 365-day mortality and excluded the cohort hospital and whether or not patients were medical or surgical (Table 3).

Development of a predictive model using Esbjerg patients as the derivation cohort

Since multivariate statistical analysis had excluded the cohort hospital and whether or not patients were medical or surgical as predictors of mortality, logistic regression was used to determine if the statistical weights (i.e. the natural log of the adjusted odds ratio) of the remaining four statistically significant predictors (i.e. age, the
decision to admit to hospital, abnormal vital signs and impaired mobility on presentation) were the same in both cohorts. An age of >68 years was used as a cut-off value as this was the age in this cohort with the highest Chi-square value for 365-day mortality. The Esbjerg cohort was used as an arbitrary derivation set to develop a logistic regression model with the binary outcome of 365-day mortality. As the adjusted odds of the four significant predictors were similar and the natural log of all these adjusted odds ratios approximated one, they were combined into a score that awarded one point to each of them (Table 4). This model had a Hosmer-Lemeshow statistic of 0.31, suggesting acceptable goodness-of-fit.

Validation and performance of the predictive model
A predictive score >=2 points had a sensitivity of 0.94 and 0.98, specificity of 0.62 and 0.38, positive predictive value of 0.11 and 0.11, negative predictive value of 0.99 and 1.00, positive likelihood ratio of 2.45 and 1.52, and a negative likelihood ratio of 0.10 and 0.04 for the Basel and Esbjerg cohorts, respectively. The c-statistic for the predictive models were 0.79 (95% CI 0.75 to 0.84) for the Esbjerg cohort and 0.87 (95% CI 0.81–0.93) for the Basel cohort. The survival curves for every point in the prognostic score were close to identical in both patient cohorts, and there was no statistical difference between them. Therefore, in the interests of clarity, they have been presented in two separate graphs (Figure 1a and 1b). In both the Esbjerg and Basel cohorts the Kaplan-Meier survival curves of patients who scored 0 and 1 point were identical whereas the survival curves of patients with 2, 3 and 4 points were all significantly different from each other. An increase in the score above 1 resulted in an exponential rise in 365-day mortality in both cohorts (Figure 2). The 365-day survival for patients with the same score was not statistically different in either cohort.

Overall (i.e. both cohorts combined) the sensitivity and specificity for a score >1 were 0.97 and 0.49, respectively; the positive likelihood ratio was 1.88 and the negative likelihood ratio 0.07. Out of the combined cohort of 2,949 patients 1,346 (45.6%) patients had a score <=1, of which 6 died (0.4%) within 365 days. Admission made no difference in the mortality of patients with the same score (Table 5). The first death for a patient with zero points in either cohort occurred 194 days after ED presentation, and the first death for a patient with one point occurred 46 days after ED presentation.
Discussion

Major findings
This post-hoc analysis of two prospective multi-center studies derived and validated a simple prognostic score based on four predictors of 365-day mortality (i.e. age >68 years, abnormal vital signs on presentation, IMOP and the decision to admit to hospital) in two different cohorts of alert and calm patient cohorts from different clinical settings. Less than two of these predictors were present in 45.6% of patients, and only 0.4% of these patients died within a year, and none within 30 days. Therefore, the presence of one or less of these predictors can be used to support discharge decisions as it is a highly sensitive means of ruling out mortality within a year. If two or more of these predictors were present, 365-day mortality increased exponentially.

Out of the numerous of potential predictors of outcome [3,8-13], our findings suggest that there are four very important ones, all of which are readily available. Our findings also highlight the importance of accurately recording a complete set of vital signs and assessing mobility on all ED attendees [25].

The findings of this study make intuitive sense. It seems unlikely that the decision to admit to hospital, or age, or an abnormal vital sign, or impaired mobility on its own would greatly increase the chance of death. However, it does seem plausible that two of these factors would significantly increase the risk of mortality, and that all four together would increase it considerably.

Strengths and Weaknesses
The major weakness was the lack of consecutive sampling in both cohorts. Dichotomization of the variables may have led to loss of information, and the selection of predictors from the merged cohorts may have led to overfitting of the model.

The major strength of this study was the close to 100% follow-up rate of all those patients included in the study. However, the Basel cohort only contained patients with a complete set of vital signs recorded at triage. Therefore, there may have been a
selection bias as these patients only accounted for 60% of all patients recruited during the study period. Although it is not universally agreed that all patients need a complete set of vital signs, the importance of vital sign measurement in the prevention of unanticipated death after discharge home from the emergency department has been well documented [26]. The ESI, a commonly used triage tool, only requires vital sign measurement on patients of intermediate to high acuity, and even after admission to hospital 10% of vital signs recordings may be incomplete [27]. The Basel cohort was an unselected ED population, whereas most patients in the Esbjerg cohort had been assessed by a clinician prior to ED arrival. Moreover, the Esbjerg cohort excluded trauma cases and only included patients who provided written informed consent and required blood to be drawn. Thus, less sick patients who did not require blood work as well as sicker patients who were unable to provide consent may have been excluded. Details of treatment given to patients was not considered and it is probable that many patients, especially those admitted to hospital, may have received life-saving treatment. Nevertheless, it is remarkable that patients with the same score had the same mortality whether they were admitted or not. Lastly, this study was limited by the relatively low number of deaths, especially amongst Danish patients.

Interpretation
The decision to admit the patient to hospital was the only non-objective variable, as it requires a subjective opinion. In many cases this opinion might be influenced the patient’s co-morbidity or evidence of a progressive chronic illness, which can require time, expertise, and either the past history or medical record to determine. Twice as many patients were admitted to hospital in Esbjerg as in Basel. This is largely explained by the fact that most Esbjerg patients were assessed by a clinician prior to ED presentation as to be likely to need admission. In addition, the decision to admit or discharge patients in both cohorts was made by whatever the treating physician encountered and not by explicit evidence-based criteria. Others have reported that decisions to admit patients to hospital can show considerable variation [28] and can take a long time and many resources [29]. Moreover, the decision to admit can be influenced by numerous factors such as the patients’ perceived instability, concern about the patients’ ability to look after themselves, their or their relatives’ preferences, or institutional reasons such as bed-availability, available technology etc. [30]. Despite all these variables, it is surprising the one-year mortality of older patients
associated with acute hospital admission is remarkably similar in several different healthcare systems [31-34].

The ability to maintain normal vital signs and mobility during illness should be regarded as a measure of a patient’s physiological reserve [35]. Physiological reserve reduces progressively with age and frailty [36], the definition and identification of which is not universally agreed [37,38]. In comparison, vital sign normality and IMOP are simple and practical pragmatic ways to quickly assess physiologic reserve in acute settings [39].

Clinical applicability
Like nearly all mortality-risk scores, our simple prognostic score was better at predicting survival than death: in both cohorts a score of >=2 points had a high sensitivity and a high negative predictive value. Nearly half of our patients had less than two predictors, none of whom died within 30 days of presentation, and only six (0.4%) within a year. Therefore, if validated by others, this prognostic score could provide clinicians with confidence that their patients are safe to discharge [1].

This simple prognostic score also identifies patients who are likely to die: 11% of patients had four predictors of mortality and 27% died within a year. Once identified it can be decided if further “life-saving” interventions are needed for these patients, or if palliative care would be more appropriate. Our score was derived from a cohort of alert ED attendees. Although the one-year mortality in both cohorts was considerably higher than that of the general population of the same age, the patients were probably far less sick than those in which the “surprise question” [14,15] and CriSTAL score [6] has been tested. It remains to be demonstrated if this simple prognostic score is more effective in identifying the need for supportive and palliative care than the “surprise question” or the CriSTAL score. However, our score is easy to remember, and, since it had a close to identical performance in both its derivation and validation cohorts, it may not have the “surprise question’s” variability in performance.
Conclusion:

A simple prognostic score based on age, the decision for hospital admission, any vital
sign abnormality at presentation and impaired mobility at presentation predicted the
one-year mortality of alert and calm patients presenting to two emergency
departments in Denmark and Switzerland. Less than two of these predictors were
present in 45.6% of included patients, and only 0.4% of these patients died within a
year. If two or more of these predictors were present, one-year mortality increased
exponentially.

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Legends to figures

Figure 1: Kaplan-Meier survival curves of a score of 0 to 4 points for Esbjerg patients (Figure 1a) and Basel patients (Figure 1b). Log rank statistics showed that for both cohorts the survival curves for 0 and 1 point were identical whereas the survival curves of patients with 2, 3 and 4 points were all significantly different. Each point in the score had statistically the same survival curves in both cohorts.

Figure 2: 365-day survival for each point in the simple prognostic score for Esbjerg and Basel patients. The 365-day survival for patients with the same score was not statistically different in either cohort.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Basel (n 1331)</th>
<th>Esbjerg (n 1618)</th>
<th>Odds ratio (95%CI)</th>
<th>Chi - square</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male gender</td>
<td>696 (52.3%)</td>
<td>795 (49.1%)</td>
<td>1.13 (0.98 – 1.32)</td>
<td>2.79</td>
<td>0.10</td>
</tr>
<tr>
<td>Admitted to hospital</td>
<td>423 (31.8%)</td>
<td>1009 (62.4%)</td>
<td>0.28 (0.24 – 0.33)</td>
<td>272.17</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Medical versus surgical</td>
<td>671 (50.4%)</td>
<td>1599 (98.8%)</td>
<td>0.01 (0.01 – 0.02)</td>
<td>962.99</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>NVSOP</td>
<td>943 (70.8%)</td>
<td>675 (41.7%)</td>
<td>1.26 (1.08 – 1.47)</td>
<td>8.80</td>
<td>0.003</td>
</tr>
<tr>
<td>IMOP</td>
<td>375 (28.2%)</td>
<td>602 (37.2%)</td>
<td>0.66 (0.56 – 0.78)</td>
<td>26.49</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Deaths within 365 days</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All deaths</td>
<td>67/1331 (5.0%)</td>
<td>121/1618 (7.5%)</td>
<td>0.66 (0.47 – 0.90)</td>
<td>6.91</td>
<td>0.009</td>
</tr>
<tr>
<td>Deaths admitted patients</td>
<td>58/423 (13.7%)</td>
<td>108/1009 (10.7%)</td>
<td>1.33 (0.93 – 1.89)</td>
<td>2.35</td>
<td>0.13</td>
</tr>
<tr>
<td>Death non-admitted patients</td>
<td>9/909 (1.0%)</td>
<td>13/609 (2.1%)</td>
<td>0.46 (0.18 – 1.15)</td>
<td>2.59</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Table 1: Differences between cohorts: NVSOP = normal vital signs on presentation, IMOP = impaired mobility on presentation.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Died (n 188)</th>
<th>Survived (n 2761)</th>
<th>Odds ratio (95% CI)</th>
<th>Chi - square</th>
<th>P</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>LR +ve</th>
<th>LR -ve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt;68 years</td>
<td>146 (77.7%)</td>
<td>966 (35.0%)</td>
<td>6.46 (4.47 – 9.37)</td>
<td>134.64</td>
<td>&lt;0.0001</td>
<td>0.78</td>
<td>0.65</td>
<td>2.22</td>
<td>0.34</td>
</tr>
<tr>
<td>Male gender</td>
<td>98 (52.1%)</td>
<td>1393 (50.5%)</td>
<td>1.07 (0.78 – 1.46)</td>
<td>0.14</td>
<td>0.71</td>
<td>0.52</td>
<td>0.50</td>
<td>1.03</td>
<td>0.97</td>
</tr>
<tr>
<td>Admitted to hospital</td>
<td>166 (88.3%)</td>
<td>1266 (45.9%)</td>
<td>8.91 (5.55 – 14.44)</td>
<td>125.25</td>
<td>&lt;0.0001</td>
<td>0.88</td>
<td>0.54</td>
<td>1.93</td>
<td>0.22</td>
</tr>
<tr>
<td>ANVSOP</td>
<td>153 (81.4%)</td>
<td>35 (1.3%)</td>
<td>3.00 (2.02 – 4.46)</td>
<td>34.99</td>
<td>&lt;0.0001</td>
<td>0.81</td>
<td>0.41</td>
<td>1.37</td>
<td>0.46</td>
</tr>
<tr>
<td>IMOP</td>
<td>141 (75.0%)</td>
<td>836 (30.3%)</td>
<td>6.91 (4.84 – 9.88)</td>
<td>156.89</td>
<td>&lt;0.0001</td>
<td>0.75</td>
<td>0.70</td>
<td>2.48</td>
<td>0.36</td>
</tr>
<tr>
<td>Medical versus surgical</td>
<td>166 (88.3%)</td>
<td>2104 (76.2%)</td>
<td>2.36 (1.46 – 3.83)</td>
<td>13.85</td>
<td>0.0002</td>
<td>0.88</td>
<td>0.24</td>
<td>1.16</td>
<td>0.49</td>
</tr>
</tbody>
</table>

Table 2: Predictors of 365 day mortality by univariate analysis: ANVSOP = abnormal vital signs on presentation, IMOP = impaired mobility on presentation, LR+ve = positive likelihood ratio, LR-ve = negative likelihood ratio.
Table 3: Logistic regression both cohorts combined with the natural log (Ln) and adjusted odds ratios for 365 day mortality. IMOP = impaired mobility on presentation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Ln Odds ratio (S.E.)</th>
<th>Adjusted Odds ratio (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admitted to hospital</td>
<td>1.35 (0.24)</td>
<td>3.85 (2.39 – 6.20)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>IMOP</td>
<td>1.14 (0.19)</td>
<td>3.14 (2.18 – 4.51)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Age (years)</td>
<td>0.04 (0.01)</td>
<td>1.04 (1.03 – 1.05)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Normal vital signs on presentation</td>
<td>-0.79 (0.20)</td>
<td>0.45 (0.31 – 0.67)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Cohort site (i.e. Esbjerg or Basel)</td>
<td>-0.03 (0.19)</td>
<td>0.97 (0.67 – 1.40)</td>
<td>0.85</td>
</tr>
<tr>
<td>Medical versus surgical</td>
<td>-0.06 (0.28)</td>
<td>0.94 (0.54 – 1.62)</td>
<td>0.82</td>
</tr>
</tbody>
</table>

Hosmer-Lemeshow statistic: p 0.27
<table>
<thead>
<tr>
<th>Variables</th>
<th>Ln Odds ratio (S.E.)</th>
<th>Adjusted Odds ratio (95% CI)</th>
<th>p</th>
<th>Model Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admitted to hospital</td>
<td>1.20 (0.31)</td>
<td>3.46 (1.90 – 6.31)</td>
<td>&lt;0.0001</td>
<td>1</td>
</tr>
<tr>
<td>IMOP</td>
<td>1.10 (0.22)</td>
<td>2.98 (1.95 – 4.56)</td>
<td>&lt;0.0001</td>
<td>1</td>
</tr>
<tr>
<td>Age &gt;68 years</td>
<td>1.10 (0.23)</td>
<td>2.90 (1.84 – 4.55)</td>
<td>&lt;0.0001</td>
<td>1</td>
</tr>
<tr>
<td>Abnormal vital signs on presentation</td>
<td>1.00 (0.25)</td>
<td>2.65 (1.62 – 4.31)</td>
<td>0.0001</td>
<td>1</td>
</tr>
</tbody>
</table>

Hosmer-Lemeshow statistic: p 0.31

Table 4: Logistic regression Esbjerg data only – only variables with statistically significant adjusted odds ratios for 365 day mortality. IMOP = impaired mobility on presentation
Table 5: 365-day mortality according to Simple Prognostic Score and hospital admission. There was no significant difference in the 365-day mortality of patients admitted and not admitted with same prognostic score.

<table>
<thead>
<tr>
<th>Score</th>
<th>Total (%)</th>
<th>Admitted (%)</th>
<th>Admitted (%)</th>
<th>Not admitted (%)</th>
<th>All patients (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Admitted (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>444 (15.1%)</td>
<td>0 (0.0%)</td>
<td>-</td>
<td>2 (0.5%)</td>
<td>2 (0.5%)</td>
</tr>
<tr>
<td>1</td>
<td>902 (30.6%)</td>
<td>170 (18.8%)</td>
<td>1 (0.6%)</td>
<td>3 (0.4%)</td>
<td>4 (0.4%)</td>
</tr>
<tr>
<td>2</td>
<td>725 (24.6%)</td>
<td>458 (63.2%)</td>
<td>22 (4.8%)</td>
<td>9 (3.4%)</td>
<td>31 (4.3%)</td>
</tr>
<tr>
<td>3</td>
<td>552 (18.7%)</td>
<td>478 (86.6%)</td>
<td>56 (11.7%)</td>
<td>8 (10.8%)</td>
<td>64 (11.6%)</td>
</tr>
<tr>
<td>4</td>
<td>326 (11.1%)</td>
<td>326 (100.0%)</td>
<td>87 (26.7%)</td>
<td>-</td>
<td>87 (26.7%)</td>
</tr>
<tr>
<td>Total</td>
<td>2949 (100.0%)</td>
<td>1432 (48.6%)</td>
<td>166 (11.6%)</td>
<td>22 (1.5%)</td>
<td>188 (6.4%)</td>
</tr>
</tbody>
</table>