No-fault compensation for treatment injuries in Danish public hospitals 2006–12

JENS TILMA1, METTE NØRGAARD1, KIM LYNGBY MIKKELSEN2, and SØREN PAASKE JOHNSEN1

1Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark, and 2The Danish Patient Compensation Association, Copenhagen, Denmark

Address reprint requests to: Jens Tilma, Department of Clinical Epidemiology, Aarhus University Hospital, Olof Palmes Allé 43-45, Aarhus N DK-8200, Denmark. Tel: +45-51-51-46-54; Fax: +45-871-67215; E-mail: jenstilma@gmail.com

Accepted 10 November 2015

Abstract

Objective: We aimed to determine the incidence rate and time trend of approved treatment injuries in Danish public hospitals from 2006 to 2012 and also to identify independent predictors of severe treatment injuries among patient and system factors and characterize the injuries.

Design and setting: We performed a nationwide, historical observational study on data from the Danish Patient Compensation Association, which receives all compensation claims from Danish health care. All approved closed claims of treatment injuries occurring in public hospitals 2006–12 were included. Health care activity information was obtained through Statistics Denmark.

Main outcome measures: Incidence rates were determined as treatment injuries per year by population and by public hospital contacts. By using a multivariable logistic regression model, we calculated mutually adjusted odds ratios to assess the association between potential predictors and severe injuries among approved claims.

Results: We identified 10,959 approved treatment injury claims in 2006–12. The total payout was USD 339 million. The mean incidence rate medians were 27.9 injuries/100,000 inhabitants/year and 0.21 injuries/1000 public hospital contacts/year. These did not increase overtime. Severe injuries and preventable cases comprised 11.0 and 41.0%, respectively. Predictors of severe injury included age 0 and above 40 years, male gender and higher level of comorbidity.

Conclusion: The incidence rate of approved closed claims at Danish public hospitals appears stable. A high proportion of injuries are preventable and both patient- and system-related factors may predict severe injuries.

Key words: clinical epidemiology, treatment injuries, no-fault compensation, registries, public health care, Denmark, patient safety

Introduction

Clinical, administrative and political interest and awareness of patient safety has grown rapidly in recent years [1]. Collection of data on adverse events is part of routine clinical work in most health care systems, and analysis of such data are crucial for meeting the goal of building a stronger safety culture with focus on prevention of errors and injuries. However, in most settings there has so far not been a strong tradition for working systematically with the data. A number of studies, particularly from the USA, have examined malpractice within surgery, emergency medicine, medical gastroenterology and pediatrics based on closed claims data regarding treatment injuries [2–5]. These studies have provided insights into high-risk patient groups and specialties; however, they do not reflect an entire population, nor do they represent a health care system with universal coverage. Only a few population-based studies from settings with no-fault compensation systems exist, e.g. New Zealand, and Norway's...
In Denmark, the Danish Patient Compensation Association (PCA) has collected detailed data on treatment injuries in health care through all claims for compensation since 1992. Compensability depends on accordance to experienced standard, equipment failure, existence of equally good alternative methods, rareness and extensive-ness of injury and accidents. The PCA database is therefore a potential valuable information source when aiming to identify critical areas of patient safety in health care, which is a prerequisite for developing and implementing effective interventions to improve patient safety. We therefore conducted a nationwide study based on PCA data to examine time trends in the incidence of approved treatment injuries at Danish public hospitals. Furthermore, we aimed to characterize the injuries and to identify predictors of severe injuries.

Methods
Setting
The Danish Health care system offers free and equal access to hospital admissions, outpatient treatment and general practitioners. Funding is ~85% publicly through taxes and ~15% privately, accounting mainly for out of pocket expenditure of pharmaceuticals and dentistry. In case of illness, the citizen contacts the general practitioner from where it is possible to be referred to a specialist or the hospital if needed. Patients are treated on the least specialized level to ensure effective, quick and relevant care [8].

Compensation claims of treatment and medical injuries are submitted to the PCA, who administers the Danish Act on the Right to Complain and Receive Compensation within the Health Service and the Danish Liability for Damages Act, which are both no-fault systems of compensation. All patients injured by treatment, examinations or by medication in the public or private health care system in all of Denmark are covered by the Danish Act on the Right to Complain and Receive Compensation within the Health Service regardless of private insurance. The PCA administration, casework and compensations are publicly funded; hence, the patient/claimant has no expenses regarding insurance, claim making, lawyers or litigation in the PCA, and neither does the physician. It is possible to appeal the decision of the PCA to the National Agency for Patients’ Rights and Complaints and second to the Court of Law.

The PCA database holds information on all claims received by the PCA. Upon receiving a claim, the PCA collects all of the medical records pertaining to the case, as well as a case report from the place where the injury occurred. A lawyer evaluates the claim in collaboration with a medical specialist to determine whether standard practice (i.e. compliance with general recommendations and guidelines) was followed. The decision is registered, as is the amount of compensation if such is assigned. Further details regarding the PCA and database are described in Clinical Epidemiology 2015 [9].

Design
We performed a nationwide cross-sectional study based on treatment injuries occurring from 2006 through 2012 reflected by approved closed claims. Our data were updated until 10 July 2014.

Claims data
We included closed claims on all types of treatment injuries occurring in public hospitals in the period 2006–12, which resulted in compensation to the patient. The data extract was based solely on injuries occurring in public hospitals, thus, not including injuries occurring in primary care or private hospitals, regardless if discovered or reported in a public hospital. PCA data are somewhat dynamic, as new information may be received and in case of appeals.

In general, financial compensation may be granted under any one of the following categories: (i) an experienced specialist would have acted differently, whereby the injury would have been avoided, (ii) defects in or failure of the technical equipment were of major concern with respect to the incident, (iii) the injury could have been avoided by using alternative treatments, techniques or methods if these were considered to be equally safe and potentially offer the same benefits, (iv) the injury is rare, serious and more extensive than the patient should be expected to endure, (v) accidents and (vi) donors and experiments (lowers threshold of compensation).

We categorized the injuries into potentially preventable (Category 1) and random/inevitable injuries (Categories 2, 3, 4, and 5), respectively. Furthermore, the claims were categorized according to severity of patient outcome (severe injury meaning ≥50% permanent injury or death). Compensation is based on the extent of personal injury and medical expenses, loss of earnings and earning capacity, pain and suffering and the expectations on whether the injury is permanent [10].

Potential predictors of severe injury
From the PCA database, we obtained data on the following potential predictors of severe injury (death or ≥50% disability): age, gender, year of injury, place of treatment (region in Denmark) and medical specialty-groups (surgery, orthopedic surgery, anesthesia/acute and internal medicine/other).

From the Danish National Registry of Patients, we obtained data on the hospitalization history of all patients included in the study. This registry contains civil registration number, date of admissions and discharges and up to 20 discharge diagnoses and procedures from somatic hospitals in Denmark since 1977, including outpatient contacts since 1995 [11]. We then computed the Charlson Comorbidity Index [12] of each patient based on previously recorded diagnoses (International Classification of Diseases, version 10) at the time of health care contact leading to treatment injury [13].

Statistical analysis
We first computed the yearly incidence rates of treatment injuries at Danish public hospitals as reflected by approved compensation claims from injuries occurring from 2006 through 2012, meaning that injuries are dated according to the time of occurrence of injury and not by the time of registration, claim, approval, nor conclusion. As the denominators, we used both the entire Danish population and the total number of hospital admissions, respectively, which were obtained from Statistics Denmark [14].

We then examined the association between potential predictors and severe injury among all patients with approved closed claims using multivariable logistic regression. We corrected for clustering of patients within hospitals (recorded in the claims database) using robust estimates of the variance derived from the Huber/White/sandwich estimator of variance. Analyses were performed using Stata, version 13.

Results
We identified 10 959 approved claims from a total of 31 212 closed treatment injury claims, all arising from injuries occurring in Danish public hospitals between 2006 and 2012. This corresponded to a mean approval rate of 35.1% (95% CI: 34.6; 35.6). No time-associated trend in the approval rate was observed during the study period. The total pay-out was 2 301 851 712 DKR (≈USD 339 million). The
Table 1 presents mutually adjusted odds ratio (OR) estimates of severe all approved claims ranging from 9.8% in 2011 to 14.0% in 2012.

<table>
<thead>
<tr>
<th>Year</th>
<th>Mutually adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>1.01</td>
<td>0.78–1.30</td>
</tr>
<tr>
<td>2008</td>
<td>1.13</td>
<td>0.84–1.52</td>
</tr>
<tr>
<td>2009</td>
<td>1.25</td>
<td>1.01–1.56</td>
</tr>
<tr>
<td>2010</td>
<td>0.89</td>
<td>0.67–1.17</td>
</tr>
<tr>
<td>2011</td>
<td>0.90</td>
<td>0.70–1.15</td>
</tr>
<tr>
<td>2012</td>
<td>1.11</td>
<td>0.81–1.54</td>
</tr>
</tbody>
</table>

The mean incidence rate was 27.9 (95% CI: 23.5; 32.2) injuries per 100000 inhabitants per year and 0.21 (95% CI: 0.17; 0.25) injuries per 1000 public hospital contacts per year. Incidence rates per year (according to year of injury) are shown in Figs 1 and 2, respectively. Together, these figures show a relatively stable incidence rate 2006–9, and then a decline from 2010 to 2012. The mean delay from injury until registration was 367 days (95% CI: 360; 375). The mean time for processing the claims was 264 days (95% CI: 261; 267) (i.e. the time from registration to decision) and additional time went into compensation size calculations and appeals [mean 234 days (95% CI: 229; 239)]. The total mean time from injuries occurring in 2006–12 until the final conclusion was 866 days (95% CI: 856; 875).

Preventable cases comprised 41.0% (95% CI: 40.1; 42.0) of all cases and ranged from 38.8% in 2006 to 42.8% in 2010 with no clear trend over time (one-way ANOVA, \( P = 0.12 \)).

Severe treatment injury occurred in 11.0% (95% CI: 10.4; 11.6) of all approved claims ranging from 9.8% in 2011 to 14.0% in 2012. Table 1 presents mutually adjusted odds ratio (OR) estimates of severe treatment injury for the examined range of potential predictors in patients experiencing a treatment injury.

Regarding predictors of severe treatment injuries: being male was associated with an increased risk compared with females. Age was associated with risk in an almost linear proportional way, except for neonate/infants, which had a markedly increased risk when compared with the reference age group of patients aged >0–40 years. Increasing levels of comorbidity were also associated with a higher risk of severe injury among approved treatment injuries.

### Discussion

Treatment injury incidence rates as reflected by approved compensation claims did not increase in Danish public hospitals 2006–12. Preventable and severe treatment injuries comprised 41 and 11% of cases, respectively. Male gender, age 0 years and age above 40 years, as well as higher level of comorbidity were all associated with an increased risk of severe treatment injuries.

### Predictors of vulnerability?

The findings regarding predictors of severe treatment injuries might be interpreted as vulnerability. Although the findings do not establish causation or predict treatment injuries in general, they do indicate that patients suffering severe injuries are more likely to be males, elderly and have a high level of comorbidity. These associations are consistent with other studies reporting that males often experience a higher severity of specific diseases and a higher subsequent mortality [15], and advancing age as well as increased comorbidity are predictors of worsened outcome [16, 17].
Underreporting?
A low propensity to file claims of treatment injuries has been reported among different groups, e.g. according to the patients’ age, social status and the severity of the injury, in both negligence and no-fault compensation systems [18, 19].

An explanation of these apparent differences is not clear. Regarding the elderly, problems might arise from the lack of computer handling abilities, which makes the patients dependent on assistance from others in order to file a claim. Since mainly reduced working ability are compensated, only patients in or before the workforce age have the ability to achieve these earnings-related payments, removing an incentive for the retired to seek compensation.

The most ill patients are also the ones who are most vulnerable to injuries and disabilities. However, they also have the shortest expected survival time, either due to the high age in itself or accelerated by a poorer overall health, and they might not find it worth to spend energy and time in the remaining part of their lives on seeking compensation that they might not themselves see paid.

Lodging a claim to the PCA is easily done and it requires only a minimum of computer handling or assistance. There are no legal or economic demands or barriers and thus follows the principle of free and equal access in the Danish Health Care system.

Even though all eligible treatment injuries might not result in a claim and potentially compensation, those that do represent the patients’ point of view of important issues regarding patient safety, because all claims are lodged by the patient or by relatives on behalf of the patient. This focuses our study on the patients’ experiences of unexpected and unacceptable outcomes or side effects from treatment in the health care system.

A hint of the development in the completeness of the reporting of treatment injuries may be seen in the fact that the incidence rates of approved claims appeared stable, while the total number of claims increased and the approval rate remained stable. Hence, the increase in total number of claims does not reflect that a higher proportion of the claims were dismissed, but suggests a catch-up in claims for older injuries, meaning a decrease in delay of claims. However, this is only a suggestion, which needs to be evaluated further in an updated dataset, where an indicator of claims catch-up could be a trend toward shorter claims delay.

Targeting—eligibility of claimants
As an indicator of targeting, we look at the approval rate of claims, which was 35% (ranging from 29% in 2012 to 38% in 2008, no clear trend). This is lower than the acceptance rate of 43% in New Zealand in 1992–2000 [20] and 64% in NZ primary care July 2005–June 2009 [21].

The explanation for the lower targeting level in Denmark is uncertain. However, more information to the patients appear warranted to improve the effectiveness of the Patient Compensation Association in providing eligible patients compensation and minimizing ineligible claims.

The potential proportion of claims of injuries caused by substandard care seems to be similar across tort systems (e.g. USA) and systems with no-fault jurisdiction (e.g. Denmark/Scandinavia and New Zealand) [22, 23].

Strengths
The data collection was nationwide. Data represent all compensation claims for treatment injuries from all authorized health care personnel in Denmark. All claims filed to the PCA are stored in the database for documentation and potential preventive initiatives.

The categorization of compensable injuries allows for identification of preventable injuries and, thereby, eases the focus of meaningful interventions.

Limitations
The study was conducted only on data from closed claims. No specific data on adverse events and the amount of potential compensable treatment injuries were available, though, adverse events reporting is mandatory in Danish health care and is done so according to a Danish adaptation of the World Health Organization’s International Classification for Patient Safety classification of patient safety incident types [24]. However, these data are anonymized and not containing civil registration numbers; hence, we are unable to determine the earlier discussed underreporting.

Some claims may have been filed with a delay from the actual injury as shown in the ‘Results’ section. Therefore, some treatment injuries occurring in the study period might still be unreported or pending and unavailable for evaluation at the data output date 10 July 2014. This might explain the decrease in incidence rates seen in 2010–12. A further update of the dataset, taking the claim delay into consideration, could reveal a more accurate development of treatment injury incidence rates during the latest years of the study period.

The data presented do not inform us about causes of treatment injuries in general. However, it does give us the possibility to identify predictors of severe among all treatment injuries. To understand the causes of treatment injuries, further evaluation of medical records pertaining treatment injuries and those records without is needed. This work might be eased by the future ICD-11 with integrated indicators of quality and patient safety [25].

Conclusion
Incidence rates of approved claims for treatment injuries at public hospitals in Denmark have been stable in recent years. However, the preventable treatment injuries continue to constitute a high proportion of all approved injuries despite many years of focus on patient safety. More detailed analysis of compensation claims may be one way of further advancing our understanding of the causes of treatment injuries and perhaps in particular the causes of severe injuries and may potentially help identifying new avenues for prevention.

Acknowledgements
We thank Lone Mortensen from the Danish Patient Compensation Association for her effort in obtaining the dataset used in this research.

Funding
The study was supported by a research grant from TrygFonden (ID number 107089).

Conflict of interest statement
None declared.

References


13. Austin SR, Wong YN, Uzzo RG et al. Why summary comorbidity measures such as the Charlson Comorbidity Index and Elixhauser score work. *Med Care* 2013;53:663.


