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THE IDENTIFICATION OF MISTAKES IN ROAD ACCIDENT RECORDS - PART TWO

KP Austin

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CONTENTS

ABSTRACT

AUSTIN, KP (1993). The identification of mistakes in the recording of accident information - part two. *ITS Working Paper **407***, Institute for Transport Studies, University of Leeds.

It has been acknowledged that there are many mistakes in the casualty variables on the police accident report forms. This study shows how a computer based linkage of police and hospital records can be used to routinely identify the mistakes for the variables of casualty age, gender and severity. The level of omissions and mis-identifications were 0.4 per cent for gender, 13.3 per cent for severity and 15.7 per cent for age. The number of records that had age omitted or coded incorrectly were not significantly greater for seriously injured casualties than for those that were slightly injured. The system could be effectively used to code casualty severity using medical information instead of relying on police judgement.

KEY-WORDS:

Contact: Kevin Austin, Institute for Transport Studies (tel: 0532-335356)

THE IDENTIFICATION OF MISTAKES IN THE RECORDING OF ACCIDENT INFORMATION- PART 2

1.INTRODUCTION

An accident report form (STATS 19) is completed for all road traffic accidents involving personal injury that the police attend or are notified of. These records are then subjected to a series of manual and automatic checks to identify any mistakes. Unfortunately some mistakes still remain after the validation process has been completed. Studies involving samples of casualties attending hospitals (Bull and Roberts, 1973 and Thorson and Sande, 1969) have identified the level and nature of these mistakes. But, the hospital records have to be manually traced to police records which is time consuming and so its use on a routine basis would not be feasible.

An effective computerised validation system for casualty data would therefore be desirable and this is echoed by the Medical Commission on Accident Prevention (1984) who stated that:

"Consideration, therefore would have to be given to some form of automatic validation, as currently exist in the processing of STATS 19 data, to reduce errors and omissions."

This paper shows how a computer based linkage of police and hospital casualty records can be used to identify mistakes in the variables of casualty age, gender and severity as part of a routine validation system.

2.METHOD

Currently, there are no computerised validation procedures available to identify mistakes in casualty gender or age, whilst for severity there is only a consistency check which identifies those records where casualty severity is greater than accident severity. This is because the severity of the accident must reflect the most seriously injured casualty.

This study links casualty information held on Humberside police files with that on Hull Royal Infirmary's Accident and Emergency database. The variables used in the matching procedure were surname, forename, address, age, gender and accident date. The matching algorithm used the Dataease Query Language (DQL) on the Dataease 4.2 database and was designed to act like a sieve by looking at various combinations of the above variables to identify any police and hospital records that were reasonably closely matched (Austin, 1992). Accident date was included in all matching levels so that those casualties who were involved in two separate accidents in the time period would not be confused. To distinguish between members of the same family either gender and forename, or gender and age, or age and forename were required to be compatible in both records for a match to be considered.

The computer algorithm matched 97.3 per cent of the 1067 hospital records that had a corresponding police record and there were only 14 (1.4 per cent) mistakes. This procedure is therefore an effective and efficient means of linking police and hospital data which enable the mistakes on the police casualty records to be identified.

3.RESULTS

3.1AGE

If casualty age is coded incorrectly for a large number of records then it could have implications on which groups should be targeted in road safety campaigns. Few studies have investigated mistakes in the coding of casualty age, although Shinar and Treat (1983) found the differences in the coding of driver age between the police records and the Multi Disciplinary Accident Investigation (MDAI) teams amounted to 11.6 per cent of the total sample. Southwell et al (1990) stated that there was a higher incidence of casualty ages ending with a 5 or 0 than other numbers, which would indicate the police round up ages, or make guesses where other information is not available. This phenomena was investigated using data from the 1038 linked police and hospital records in this sample. The number of casualties of each age recorded by the police were graphed (see Figure 1). The results indicate that those casualties with ages ending in a 5 or a 0 (highlighted in black) are not greater than any other age and so the hypothesis does not stand in this case.

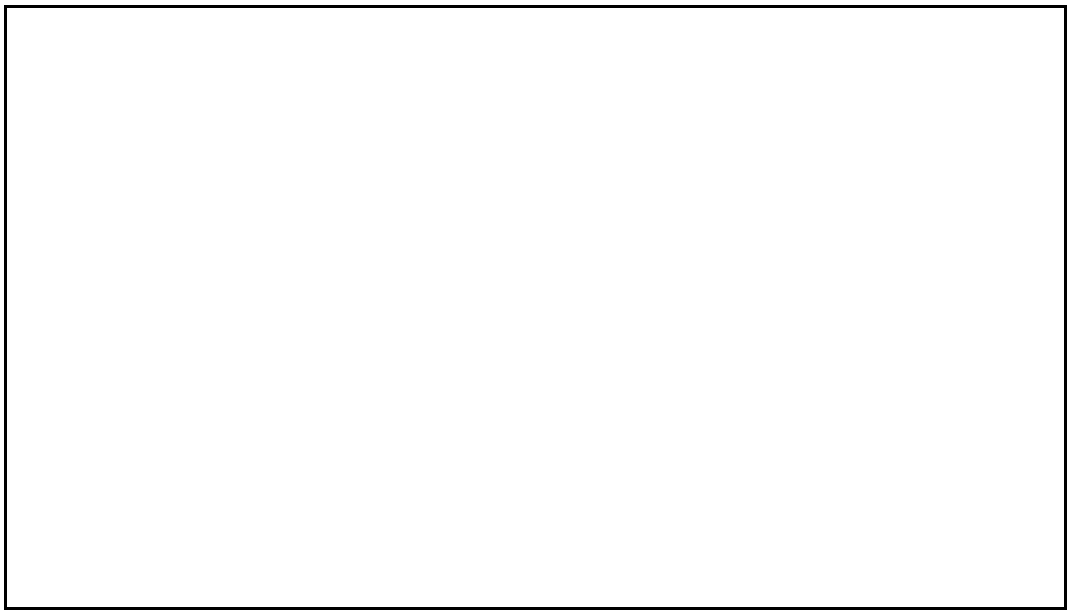

Figure 1: Number of casualties by casualty age

In this study age was omitted by the police in 37 records (3.6 per cent) and in a further 126 records (12.1 per cent) the ages recorded by the police and hospitals differed. The hospital may record casualty age more accurately than the police because it is calculated from the casualty's date of birth, which is more precise than asking the casualty their age or estimating it. Casualties that are seriously injured may be unable to give details to the police and so this idea was investigated to identify if seriously injured casualties have a higher level of mistakes and omissions than those that were slightly injured. The results are shown in Table 1.

Table 1:The level of mistakes and ommissions in casualty age by severity.

Severity	Omissions and mistakes	Number in total	Per cent
Fatal	1	14	7.1
Serious	43	236	18.2
Slight	119	788	15.1
Total	161	1038	15.5

The lowest level of omissions and mistakes were for fatal casualties. This is because the information is required for a coroners inquest and so time and effort are put in to ensure the data is accurate. In fact, for 7 of the 14 fatalities no age was recorded by the hospital. Seriously injured casualties did not have a significantly higher level of omissions and mistakes in casualty age than those that were slightly injured ($\chi^2 = 1.33$, $p > 0.1$ with 1 d.f.) For seriously injured casualties 6 per cent of ages were omitted on hospital records, whilst for slightly injured casualties this figure was 1.3 per cent.

A linked police and hospital database could reduce the mistakes and omissions in the coding of casualty age from 15.7 per cent of the linked police and hospital casualties to 0.2 per cent. The residual 0.2 per cent is due to age being omitted from both the hospital and the police records. If there are many years difference in casualty age between the hospital and police records then the number of casualties within each age cohort could be incorrect, so the targeting of population groups for road safety campaigns will not be optimised. The differences were calculated and the results are shown in Figure 2. In over 60 per cent of cases the ages differed by only one year and in 83 per cent of cases they differed by five years or less, hence the present inaccuracies are unlikely to affect safety studies greatly. However, even a slight improvement in the accuracy of the data, if it can be achieved easily, would be useful.

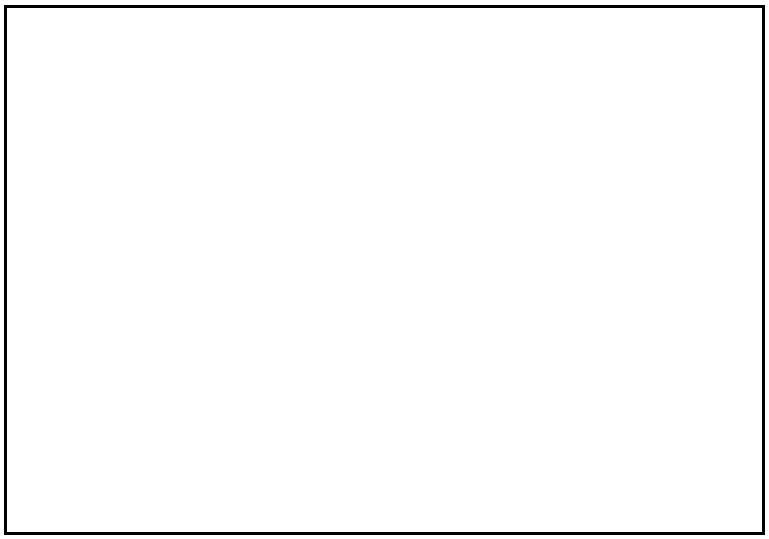

Figure 2: Difference in age (years) between hospital and police records

3.2GENDER

This study identified one case where gender was omitted on the police files and a further three cases where gender differed between the hospital and the police files. For those records with discrepancies, the casualty's forename on both the police and the hospital records were shown. The police were incorrect in two of these and so the total level of omissions and mistakes were 0.4 per cent for this variable. The adoption of this validation procedure could mean the number of omissions and mistakes in casualty gender for the linked records will be eliminated.

3.3ACCIDENT SEVERITY

The severity of a casualty's injuries are assessed by the police officer investigating the accident and are based on the following classifications.

- A fatal injury is when a casualty dies from their injuries within 30 days of the accident.
- A serious injury is when a casualty was admitted to hospital as an in-patient or sustained fractures, internal injuries, severe cuts and lacerations, crushing, concussion or severe shock.

- A slight injury would involve roadside attention or admission to hospital as an outpatient. This category includes sprains, bruises and cuts not judged to be severe and slight shock.

The combined totals of casualty severity are regularly used to estimate the societal cost of injury accidents at certain locations and to particular groups. Any discrepancies in the coding of severity will affect these totals which could alter the priorities given to these groups or locations.

Bull and Roberts (1973) identified 5.8 per cent of police and hospital records were coded differently. This entailed 2.7 per cent of slightly injured casualties coded as serious and 7.4 per cent of seriously injured casualties coded as slight. Thorson and Sande (1969) stated that 20 per cent of seriously injured casualties were identified by the police as slightly injured. Agran et al (1990) compared the Injury Severity Score (ISS) from the hospitals to the coding of severity by the police and found 51 per cent of the casualties whose ISS coding was indicated as serious were defined as 'complaint of pain' or 'visible injuries' by the police. Whilst for 7.4 per cent of casualties, the ISS

recognised the injuries to be slight when the police coded them as serious.

In this study 14 casualties were identified as fatally injured on the police records, of which six died before arrival or within the Accident and Emergency Department, four were sent to the intensive care unit and four were sent to the wards. A coroners inquest is required for all road traffic related fatalities which involve the police and so all fatalities would be included.

There were 236 casualties defined as seriously injured on the police files of which 190 were detained overnight and a further 24 incurred fractures but were not admitted, hence 22 casualties did not conform to these criteria. The location and type of injury for these casualties are shown in Table 2.

Table 2:The location and type of injury for casualties identified as seriously injured by police but were not detained overnight nor received fractures.

	Head	Trunk	Limbs	Not known
Laceration	2	-	-	-
Contusion	2	2	6	1
Sprain	-	1	5	-
Head Injury	1	-	-	1
Not known	-	1	-	-

Injuries to the limbs and contusions accounted for 16 of the 22 casualties that the police classified as seriously injured but did not require admission. In total 9.3 per cent of seriously injured casualties could be reclassified as slightly injured although the severity of contusions, abrasions and lacerations were not possible to assign with the available hospital information and so these casualties could have been seriously injured.

There were 788 casualties that were classed as slightly injured by the police, of which 75 were admitted to hospital and 39 incurred fractures. The location and type of injury for these casualties are shown in Table 3.

Table 3:The location and type of injury for casualties identified as slightly injured by the police but recieved fractures or were detained overnight.

	Head	Trunk	Limbs	Not known
Contusion	6	-	3	1
Laceration	7	2	3	-
Sprain	2	-	-	1
Fracture	5	14	35	-
Head injury	15	-	2	-
Not known	6	2	1	-

Head injuries accounted for a large proportion of those admitted (39 out of 54) and in many of these cases it would be as a precautionary measure. In total, 14.5 per cent of casualties identified by the police as slightly injured were seriously injured. An additional 382 casualties received contusions, abrasions or lacerations and were not admitted. Because there was only a limited amount of information available, the injuries to these casualties was assumed to be slight. In total, 13.1 per cent of casualty records had severity incorrectly coded.

Hospitals are increasingly becoming computerised and so the application of a linked police and hospital database to code casualty severity will soon be feasible. Over 97 per cent of casualties who appeared on both the hospital and the police records are captured by this system and so any

casualties recorded by the police but not by the hospital could be assumed to be slightly injured. It is likely that only 0.6 per cent of casualties will be coded incorrectly by this system which is considerably lower than the current value. This figure is calculated by multiplying the proportion of seriously injured casualties by the proportion of casualties recorded on both the hospital and police records that the algorithm failed to match. A regional or national linkage would avoid the problem of missing casualties who were injured in one highway authority but received treatment at a hospital in another highway authority. The application of this system will code casualty severity more accurately and also reduce the burden on the police to collect this information.

4.CONCLUSIONS

The computer based method of linking police and hospital casualty records using the name and address of the casualty is an efficient way of routinely identifying the mistakes in the variables of casualty age, gender and severity. The level of mistakes were 0.4 per cent for gender, 13.1 per cent for severity and 15.7 per cent for age. The number of records where age was omitted or incorrectly recorded was not significantly greater for seriously injured casualties than those that were slightly injured. The number of years difference in age between the police and the hospital records was small and so it would be unlikely to affect safety studies greatly. The adoption of this system on a regional or national basis could allow severity to be determined from hospital information rather than using the judgement of the police officers. This should provide more accurate data and will reduce the burden on the police to collect this information.

5.ACKNOWLEDGMENTS

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