6

A poor way to die: social deprivation and road traffic fatalities

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Abstract

A sample of 893 fatal vehicle occupant cases was considered, from 10 UK police forces, from the years 1994–2005 inclusive. Each case was summarised on a database that included the main objective features (such as time and place), a summary narrative, a sketch plan and a list of explanatory factors. Each case was then assigned an Index of Multiple Deprivation (IMD) score based on the postcode/address of the primary fatality, and these scores were separated into IMD quintiles.

The main findings were that driving at excessive speed, driver intoxication, driver/passenger failure to wear seat-belts, and unlicensed/uninsured driving were most prevalent in fatal collisions in the most deprived IMD quintiles. Young drivers (under 24 years) form high proportions of fatal casualties across all IMD quintiles. Older drivers and passenger fatalities are more concentrated in the least deprived IMD quintiles.

Introduction

Research has indicated that social deprivation is associated with increased injury and fatality levels in road traffic collisions. In an international review, Petridou and Tursz (2001) commented that ‘existing data indicate that socio-economic disparities are predictors of both injury morbidity and mortality as well as the long-term outcome of an injury’. Abdalla *et al*. (1997), in an analysis of a database created by merging road casualty information and census data in Scotland, noted that ‘… in general it was found that the casualty rates amongst residents from areas classified as relatively deprived were significantly higher than those from relatively affluent areas’. Similarly, Chichester *et al*. (1998), in a study that analysed hospital accident and emergency (A&E) admissions and investigated associations between road traffic accidents (RTAs) and socio-economic status, reported '… findings [that] strongly suggest a positive trend between RTA activity and deprivation … for gender, victim role, purpose of journey and age'. Chichester *et al*. (1998) recommended 'further research between RTAs and deprivation'. In a comprehensive study of trends in fatal car-occupant collisions (Department for Transport, 2007), it was noted that 'there is some evidence, among men aged 20–64 … that the risk of death increases with disadvantage'.

Regarding unlicensed drivers, in particular, research published by the Department for Transport (2003; 2007) showed that 'crashes were significantly more severe when an unlicensed driver was involved', and that 'there is also evidence that young men from more disadvantaged backgrounds are **less** likely than their more affluent peers to have a full driving licence and are **more** likely to be driving unlicensed and/or uninsured. While the link to fatalities is not proven, there is evidence which suggests that accidents of unlicensed drivers are more frequent and more severe.'

Method

A sample of 893 fatal vehicle occupant cases was considered, from 10 UK police forces, from the years 1994–2005 inclusive. Each case was summarised on a database that included the main objective features (such as time and place), a summary narrative, a sketch plan and a list of explanatory factors. Each case was then assigned an Index of Multiple Deprivation (IMD) score based on the postcode/address of the primary fatality, and these scores were separated into IMD quintiles.

How an Index of Multiple Deprivation is defined

Super Output Areas (SOAs) are small areas of the country specifically devised to improve the reporting and comparison of local statistics. Within England and Wales there is a Lower Layer (minimum population 1,000) and a Middle Layer (minimum population 5,000). Unlike electoral wards, these SOA layers are of consistent size across the country and are not subjected to regular boundary change. The IMD 2004 uses over 30,000 Lower Layer Super Output Areas (LSOAs) to determine a measure of how deprived an area is, based on income, employment, heath deprivation, education, skills, training and geographical access to services. Each LSOA area in England and Wales is then given a ranked score from 1 (most deprived) to 32,482 (least deprived).

Index of Multiple Deprivation quintiles in the Nottingham fatal accident database

Levels of deprivation associated with accidents in the dataset were assessed using the IMD. Scores were assigned on the basis of postcode data, or the first line of the address, for fatalities in a truncated data file. This work was carried out with the kind help of researchers at University College London (UCL). The IMD scores generated by this process were then added to the correct full fatal case files available at the University of Nottingham. (This rather elaborate process was used in order to comply with the requirements of the Data Protection Act.)

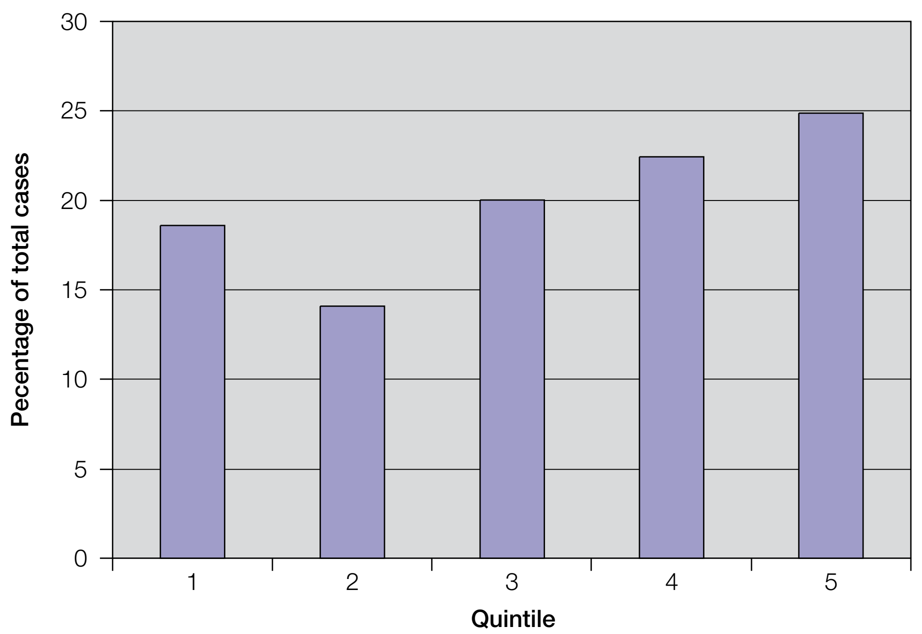
There were 893 case records that could be matched with IMD scores (approximately 75% of the Nottingham fatal accident database). These were cases where the postcode or first address line of an in-car fatality had been assigned an individual IMD score by researchers at UCL. Where IMD scores were available, case records were coded to IMD quintile scores, i.e. 1 (most deprived) to 5 (least deprived).

Results

Overall distribution of the sample

Figure 1 shows the distribution of fatal car occupant collisions in the sample by IMD quintile expressed as a percentage of the sample (*n* = 893).

Figure 1: **Proportion of cases in each IMD quintile (*n* = 893)**



It can be seen in Figure 1 that fatal car-occupant cases peak in the least deprived quintile (five – nearly a quarter of total cases).

Deprivation, fatality and speed

Speeding accidents were examined, and divided into separate types, based predominantly on levels of risk-taking by drivers:

- **Type 1**: deliberate risk-taking involving speed in excess of the limit.

- **Type 2**: deliberate risk-taking involving driving too fast for the road conditions, for example cornering deliberately fast.
- **Type 3**: ignorance of speed, for example failing to realise that wet road conditions increase the likelihood of skidding.
- **Type 4**: misjudgement of the correct speed for the conditions, for example misjudging the sharpness of a bend.

Judgements were made by individual researchers, using all the available data. Primary sources included, for example, witness statements from surviving passengers concerning the vehicle speed/driver behaviour, or accident reconstruction reports using critical speed marks left by a car to calculate a likely velocity range at the point of control-loss (usually compiled by a specially trained police traffic officer).

These four types of speed accident were examined in relation to the IMD associated with the driver. Figure 2 shows the overall contribution of all types of speed to fatal accidents by driver IMD quintile.

Figure 2: **Speed – all speed-related accidents (proportion of each quintile)**

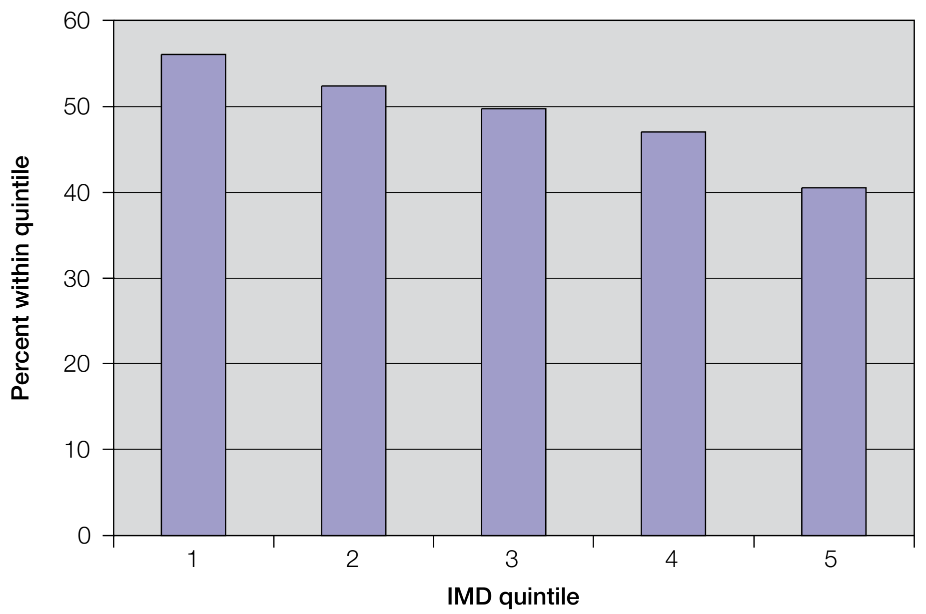
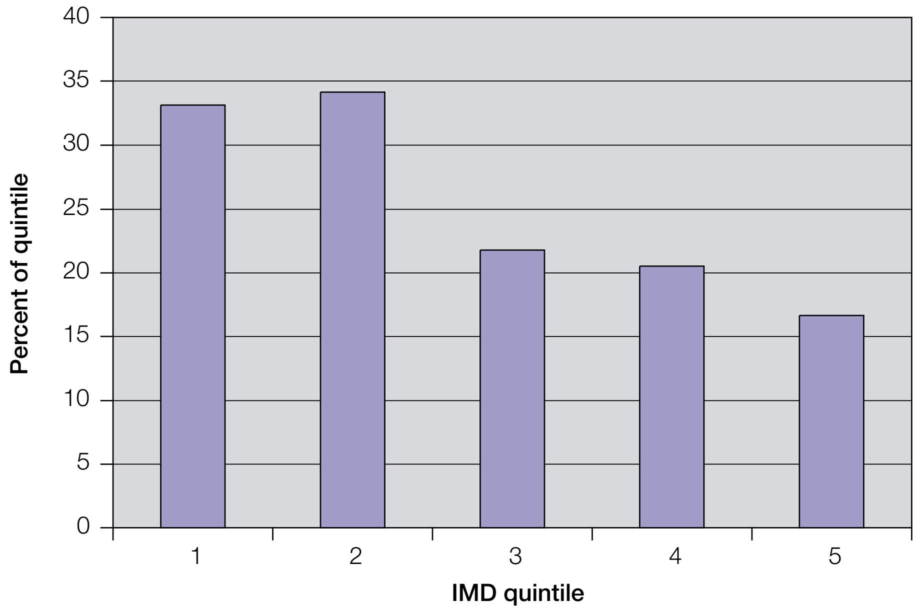


Figure 3 shows a similar distribution in the type 1 speed accidents – deliberate risk-taking involving speed in excess of the limit.

However, the distribution of type 2 speed accidents (deliberate risk-taking involving driving too fast for road conditions, for example cornering deliberately fast), was different, showing a flatter distribution of percentages in each quintile.

Unfortunately, it was not possible to obtain meaningful results relating to type 3 and 4 speeding accidents, as frequencies (and resulting percentages) were very low. The majority of speed-related fatal cases involved the two risk-taking kinds of speeding.

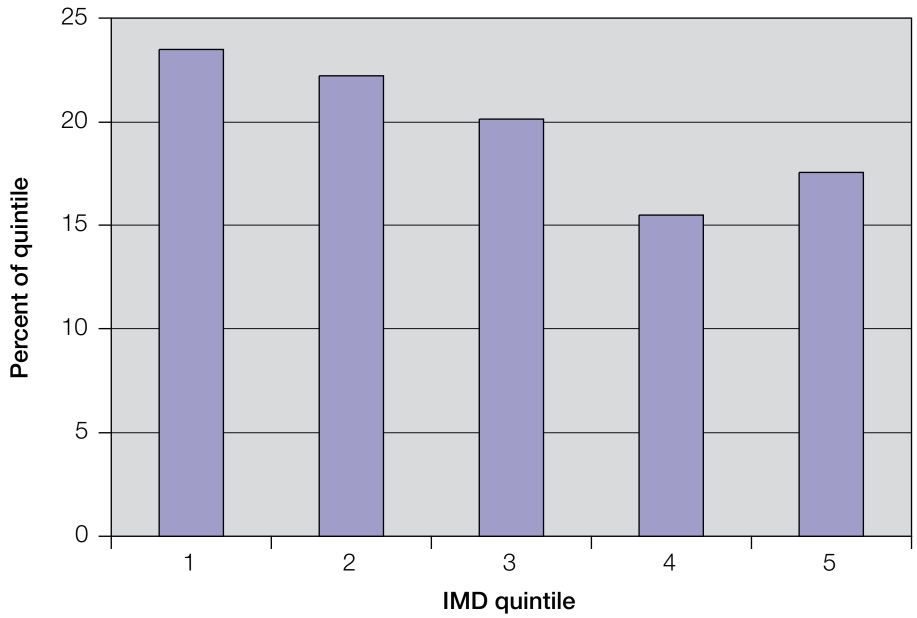
Figure 3: **Risk – deliberate risk-taking involving speed in excess of the limit (proportion of each quintile)**



Deprivation, fatality and impaired driving

Figure 4 shows the level of drink/drugged driving in the sample by IMD quintile, expressed as within-quintile percentages.

Figure 4: **Impairment – cases involving impaired driving (proportion of each quintile)**

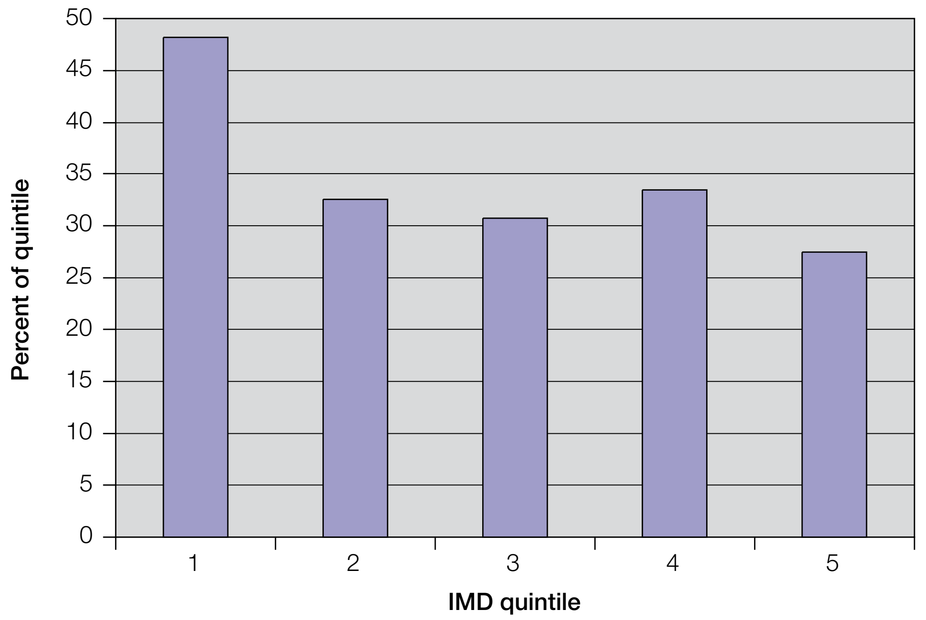


It can be seen that the two most deprived IMD quintiles have over one in five of their fatal accidents including alcohol or drugs as a contributory factor.

Deprivation, fatality and seat-belt wearing

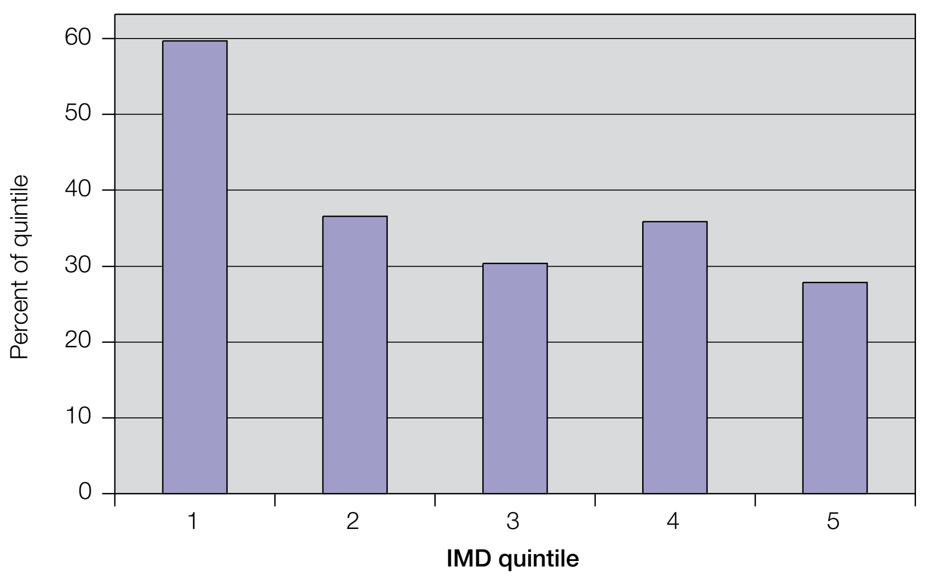
Figure 5 shows the percentage of fatalities not wearing seat belts (both driver and passenger fatalities) by IMD quintile.

Figure 5: **Seat belts – fatalities not wearing seat belts (proportion of each quintile)**



It can be seen that the most deprived IMD quintile (1) has nearly twice the percentage of non-seat-belt wearing fatalities compared with the least deprived quintile (5). If passenger fatalities are considered alone, the difference in percentage distribution becomes even more stark, as shown in Figure 6.

Figure 6: **Passengers and seat belts – passenger fatalities not wearing seat belts (proportion of each quintile)**



Deprivation, fatality and driving licence violations

Eight per cent of the IMD sample cases involved a driver without a full driving licence (either through having no licence at all, driving illegally on a provisional licence, or driving while already disqualified). Two-thirds of these cases were single-vehicle accidents, approximately twice the proportion observed in the sample as a whole. Factors such as excess alcohol and drugs, and excess speed were found to be common in this group. Figure 7 gives a breakdown by violation type.

Figure 7: **Licensing – unlicensed, provisionally licensed and disqualified drivers**

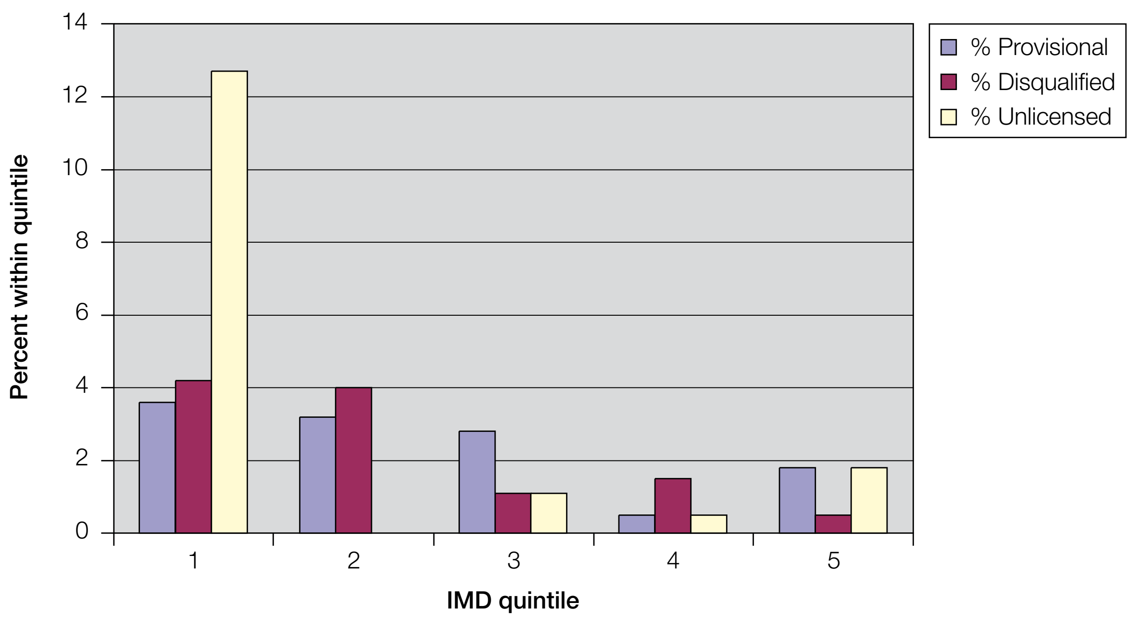


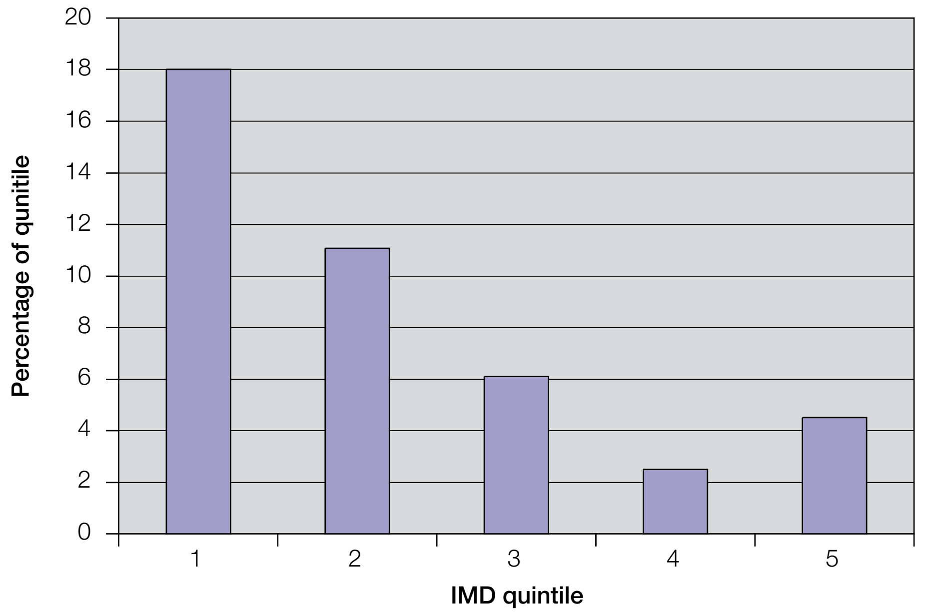
Figure 7 clearly shows that fatalities involving driving licence violations are especially prevalent in the lowest IMD quintile (1), and the most common violation within this quintile is driving without any kind of licence.

Deprivation, fatality and insurance violations

Approximately 7% of all cases involved a driver without mandatory third-party insurance. This is probably an underestimate, as this information was not always recorded if the police could convict the offender for another serious offence; there was also considerable 'overlap' with the group of 'no-licence' offenders detailed above. Figure 8 shows clear differences in uninsured driving across IMD quintiles.

It can be seen in Figure 8 that the most deprived quintile (1) has over three times the recorded rate of insurance violations in fatal collisions as the least deprived quintile (5).

Figure 8: **Uninsured driving – fatalities involving uninsured driving (proportion of each quintile)**



Deprivation and passenger fatalities

Of the 893 available cases, 284 (approximately 32% of the IMD sample) involved the death of one or more passengers in a vehicle. There were also 110 cases (approximately 12% of the IMD sample) involving more than one fatality (multiple fatalities were defined as those with two or more fatalities, driver fatalities included). Figure 9 shows the percentage of multiple fatalities (including the driver) within each IMD quintile, expressed as a percentage of all passenger fatality cases for that quintile.

Figure 9: **Multiple fatalities – number of fatalities (proportion of each quintile)**

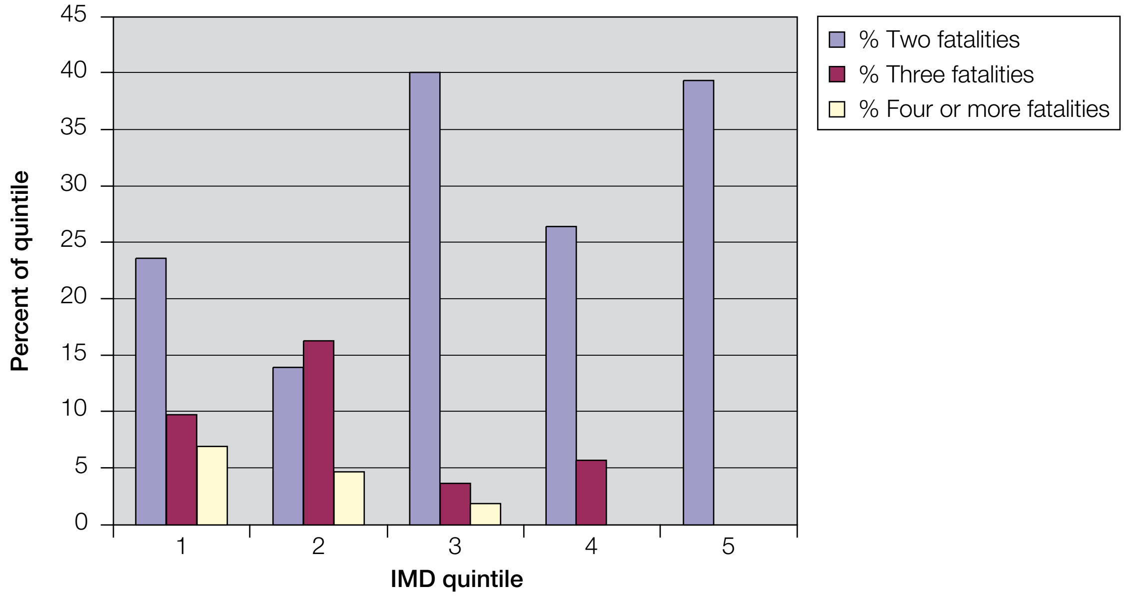
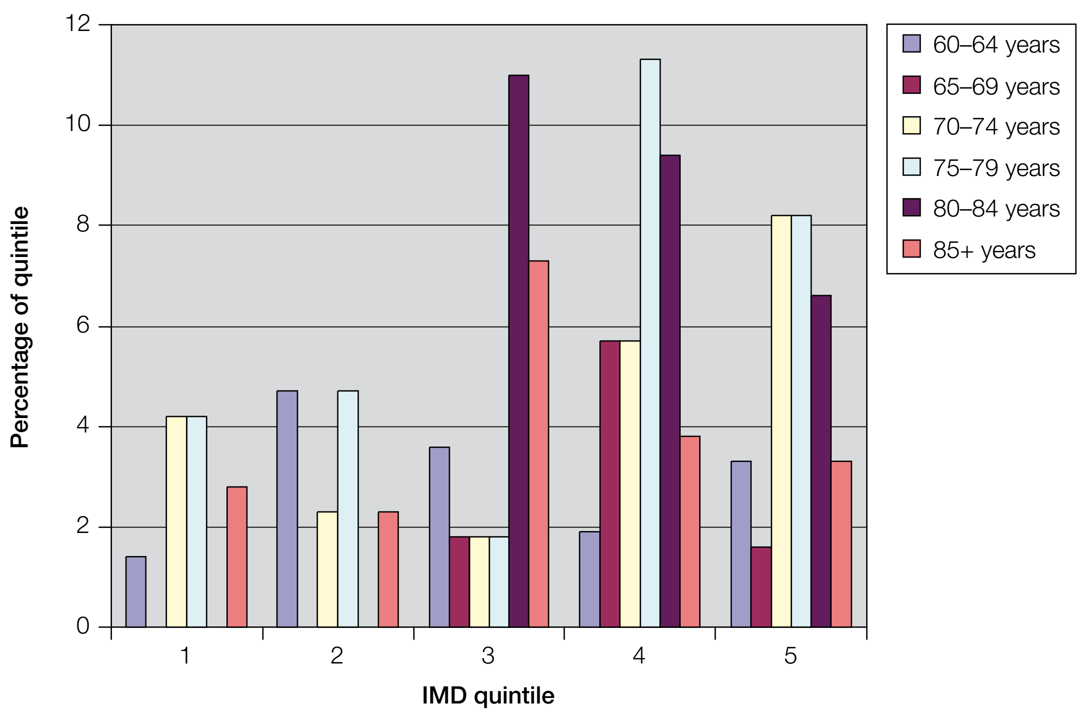


Figure 9 shows that, while fatal cases involving two persons seem more prevalent in the higher IMD quintiles, fatalities involving three or more persons seem to be concentrated in the lower deprivation quintiles.

Deprivation and elderly passenger fatality

Approximately 8% of the IMD sample involved the fatality of a passenger aged 60 years or over. Figure 10 shows the percentage of passenger fatalities in various age bandings over 60 years by IMD quintile.

Figure 10: **Older passengers – passenger fatalities aged 60+ (proportion of each quintile)**



It can be seen in Figure 10 that passenger fatalities aged over 80 years are concentrated in the top three IMD quintiles.

Deprivation and 'unsurvivable' crashes

The Transport Research Laboratory (TRL) has defined 'unsurvivable' accidents as 'collisions or roll-overs that would be expected to result in fatal injuries to correctly restrained occupants of a passenger car' (e.g. in Broughton and Walter, 2007). Approximately 50% of the IMD sample comprised cases where one or more vehicle occupants were either declared dead at the scene, or who died in transit to hospital. A further 4% of cases died within one to four hours of reaching hospital. Figure 11 shows the percentage of cases in each quintile considered as 'unsurvivable' (using the first definition above).

Figure 11: **'Unsurvivable' cases – dead at the scene/on arrival (proportion of each quintile)**

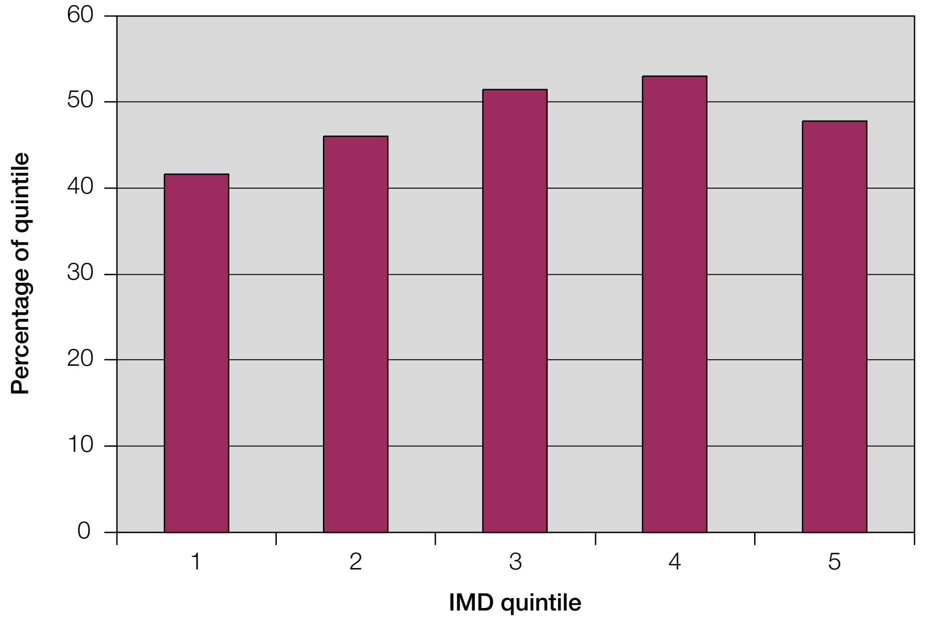


Figure 11 shows that the proportion of 'unsurvivable' crashes seems to increase in the higher IMD quintiles.

Discussion

In approximately 25% of total cases, fatal car-occupant cases peak in the least deprived quintile (5). This is perhaps surprising as, for many indices of risky driving behaviour, lower IMD scores are associated with higher observed percentages of total cases involving such factors. This was found to be the case in speed-related fatal collisions, and particularly those involving deliberate risk-taking involving speed in excess of the speed limit. Drivers and passengers involved in fatal accidents in lower quintiles were also more likely to be not wearing a seat belt, more likely to be under the influence of alcohol, more likely to be travelling while unlicensed and uninsured, and more likely to be in multiple-fatality collisions. There was also limited evidence (not reported here) that fatalities in the lowest two quintiles were more likely to occur late at night or in the early hours of the morning.

Further analysis of the data has shown some reasons for the apparent anomaly, however. When both driver and passenger fatalities are examined by age, it can be shown that all quintiles contain high proportions of younger drivers/passengers, particularly in the 16–19-year-old age range. However, older driver and passenger fatalities are found proportionally more often in the higher, least deprived quintiles. The percentage of driver fatalities aged between 60–74 years and over 75 years generally increases across IMD quintiles; furthermore passenger fatalities aged over 80 years were concentrated in the top three quintiles.

It would seem, therefore, that the top quintiles in the sample are 'doubly loaded', i.e. have the same high proportion of younger, risk-taking drivers as cases in other quintiles **and** a higher proportion of older fatal casualties, when compared with lower IMD quintiles. Other research, for example Maycock (1997), has estimated that 'half of the increased fatality risk of drivers aged 75 years or more, compared to drivers aged 30 years, might be due to the enhanced susceptibility of the older drivers to be killed in the accidents in which they are involved, rather than to their higher accident rates'. When the percentage of cases in each quintile considered as 'unsurvivable' were examined, there was some evidence that the proportion of such accidents increased across IMD quintiles, and perhaps it is the higher proportions of older driver and passenger fatalities found in the higher quintiles that may offer one explanation for this finding.

In many other respects, the IMD sample can be regarded as an entirely representative sample of cases from the main fatal accident database held at Nottingham University. Previously published research on this database (Clarke *et al*., 2007) showed that there were two main problem areas: the first, and apparently greater one, concerned the behaviours engaged in by younger drivers and their passengers, of all IMD classes, who took the most risks and travelled at the highest speeds. Such young drivers in fatal accidents are 'violators', as described, for example, in the work of Reason *et al*. (1990) and Åberg and Rimmö (1998). The second, somewhat smaller problem area in the previous research, concerned misjudgements and mistakes made by elderly drivers that lead to fatalities. Older drivers have appeared both to be more likely to be involved in fatal 'right of way' collisions (Clarke *et al*., 2007) and they were also more likely to appear in the higher IMD quintiles in this study. Such older drivers are more prone to the errors (as opposed to violations) described by Reason *et al*. (1990).

Conclusions

The results from this study suggest that campaigns/enforcement focusing on the areas of speeding, driver intoxication, seat-belt use and unlicensed/uninsured driving (although important across the board) should perhaps be focused additionally on communities in IMD quintiles 1–2. Researchers such as Begg and Langley (2000) have shown that there is a link between such areas of risk-taking, i.e. that drivers who failed to wear a seat belt were more likely to drive at speed and/or while intoxicated. This suggests that it is general driver attitudes regarding risks to themselves and others that are the problem, rather than attitudes towards discrete risk-taking behaviours considered in isolation. Similar links regarding networks or patterns of aberrant behaviour have been found in other studies: Broughton (1999) established a link between unlicensed driving and other types of car crime, for example. Such observations have led authors such as Corbett (2003) to argue that the emphasis in enforcement should be put on 'intelligence-led offender targeting and intelligence gathering' in police vehicle-stop scenarios.

It would seem that, in the case of fatal accidents at least, certain groups of drivers cannot be told often enough of the dangers to which they can expose themselves and their passengers, and perhaps that additional measures focused on particularly disadvantaged groups need to be added to the provision of safety information.

Acknowledgements

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