A Public Health Review of North East Lincolnshire Road Traffic Casualties 2011-2015

Contents

Executive Summary

Casualties arising from road traffic incidents contribute to a significant proportion of mortality and morbidity across the United Kingdom. Between 2011 and 2015, 8,873 people died due to injuries sustained on Britain's roads, and a further 112,769 were seriously injured.

In recent years, the introduction of the Public Health Outcomes Framework by Public Health England has highlighted that North East Lincolnshire has a high rate of people killed and seriously injured (KSI), across both children and the population as a whole. The Director of Public Health requested that a seminar should take place bringing together a range of experts in North East Lincolnshire to discuss this issue and identify areas for improvement and this took place in September 2016. This report was produced following that event.

This report shows that although rates of road casualties remain relatively high there have been considerable improvements in the last ten years. Nevertheless there are still some identifiable areas for improvement. Key findings from this report suggest that:

- North East Lincolnshire's KSI rate has seen a reduction since 2011, but remains above both the national (England) and regional figure, for 2013-2015.
- However, despite the still relatively high KSI rate, North East Lincolnshire has a *low* rate of fatalities, suggesting that a high number of serious injuries are responsible for the high KSI rate.
- North East Lincolnshire has a high rate of injuries amongst cyclists, despite having little demographic similarity with other local authorities with high rates of cyclist injuries, such as lacking a university or being a large urban centre (i.e. Cambridge, York, Brighton or London boroughs)
- North East Lincolnshire's most deprived residents are at a greater estimated likelihood of becoming a road traffic casualty. The general finding of deprivation being linked to road casualties is however a national (England) issue and not specific to North East Lincolnshire.
- There is evidence to suggest that there may be a greater association between young drivers and casualties in North East Lincolnshire than the UK. However, the evidence for this is not as robust as it could be and requires further investigation.

The report highlights that despite improvements in recent years the rate of casualties on roads in North East Lincolnshire is higher than in other comparable parts of the country. Rates are especially elevated amongst cyclists and people who live in more deprived communities who experience the most dangerous roads on a daily basis.

It is recommended that progress on road casualties should be monitored closely within the Council's new Outcome Based Accountability framework and that scorecards should be developed around the KSI rates for all ages and those specifically focused on children. It is also imperative that road casualty reduction strategies should be linked to wider public health strategies on active travel so that any improvements in road safety are not at the expense of people using active methods of transport such as walking and cycling to move around. Ideally, we should be looking to develop transport systems which make people feel much safer about walking and cycling in North East Lincolnshire and investments should be focused on this in the future.

Introduction

This is a report containing information on road traffic incidents relating to North East Lincolnshire for the years 2011 through 2015. The focus of this report is on casualties arising from road traffic incidents that occurred within the North East Lincolnshire authority boundaries.

In the context of this report, 'crash' refers only to crashes that were a) reported to, or attended by the police that b) resulted in personal injury to at least one person. All crashes and casualties reported refer to those that were recorded to have happened between January 1st 2011 and December 31st 2015. Any exceptions to the above will be clearly stated. 'Children' are those under 16.

Between 2011 and 2015, there were 2,423 crashes in North East Lincolnshire. These crashes resulted in 3,490 casualties, 444 of which were children and 3,046 adults.

The true number of crashes that took place may well be higher if crashes are not reported to the police or do not result in any injury. The number of 'near-misses' which under different circumstances could have resulted in a crash, is also unknown.

Methodology

The statistics presented in this report are primarily from the MAST Road Safety Analysis database. Access to this database was arranged through Safer Roads Humber, a division of Humberside Police. The MAST database obtains data from the Department for Transport (DfT). Not all of the raw data from the DfT is included in the MAST database, but it is publicly available and provides greater detail. In particular, this data was used to produce the maps showing precise locations of crashes.

Many comparisons made in this report between geographical areas, or socio-demographic groups are made either through percentages or per capita through rates. It is important to note that when working with small numbers of crashes and casualties – for example at ward level – percentages and rates are more easily skewed due to the small numbers involved, and that in some instances the raw number is more meaningful than the percentage or rates.

Most comparisons made to other local authorities are authorities that fall into one of the following two groups:

- The rest of the Humberside authorities. As above, this is North Lincolnshire, Hull and East Riding of Yorkshire.
- North East Lincolnshire's five closest statistical neighbours which are: Redcar and Cleveland; Hartlepool; Sunderland; North Tyneside and Doncaster.

In the context of this report, references to 'other Humber authorities' or 'rest of the Humber' refer to North Lincolnshire, Hull and East Riding. 'Statistical neighbours' refers to the five closest statistical neighbours above. National refers to *England*, not the United Kingdom.

1 Casualties within North East Lincolnshire

This section presents information on the following:

- Crash location, including junctions and traffic lights
- Casualty severity, including estimates of the KSI rate over time
- Casualty demography, including age and gender and socio-economic status
- Casualty method of transport
- Casualty time of day, day of week, month of year and impact of weather
- Speed limit of road on which the crash occurred
- A focus on cyclists specifically

Crash location

Figure 1 below shows a map of all crashes in North East Lincolnshire between 2011 and 2015. As might be expected, crashes tend to follow the major roads and cluster in urban areas. Technical Appendix A (separate document) gives maps for each of North East Lincolnshire's fifteen electoral wards.

Figure 1 - Map of all crashes in North East Lincolnshire, 2011-2015

Source: Department for Transport (2016)

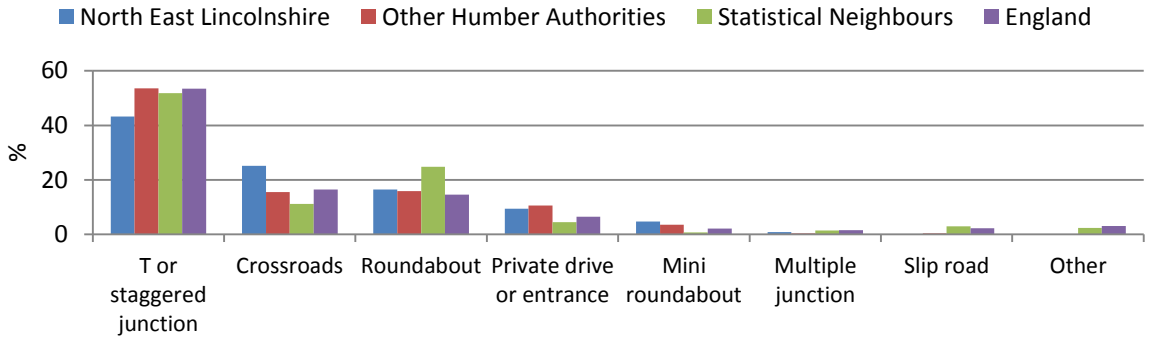
Junctions and traffic lights

Nearly two-thirds of crashes (1,551, 64%) involved a junction in some way or another, which is defined as being within 20m of a junction. 671 at T or staggered junctions, 391 at crossroads, 255 at full-size roundabouts, 146 at private entrances or driveways, 74 at mini roundabouts, 13 at multiple junctions and 1 on a slip road. Figure 2 overleaf shows the

percentage of crashes at each type of junction, compared to the remaining Humber authorities as a whole, and North East Lincolnshire's statistical neighbours.

The differences in the values shown below are likely to be more reflective of the structure of the road network than anything else. It is reasonable to assume that North East Lincolnshire has proportionally fewer T or staggered junctions, and more crossroads than the other areas compared, than it is to assume that North East Lincolnshire's drivers drive safer on T-roads or staggered junctions and drive less safe on crossroads.

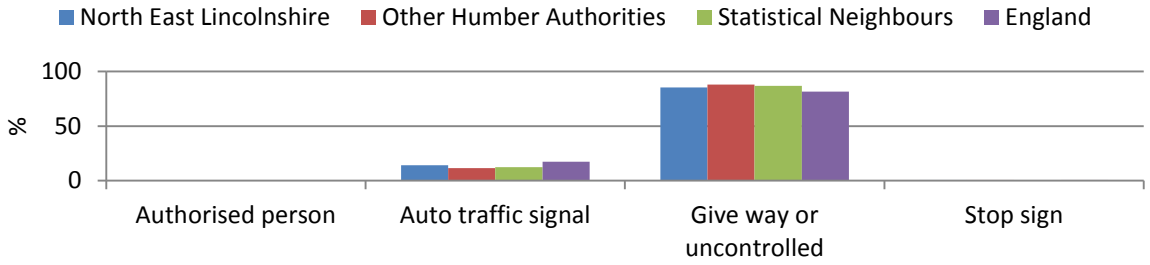
Figure 2 - Percentage of *all crashes* by junction type for North East Lincolnshire, other Humber authorities combined, statistical neighbours combined and England, 2011-2015



Source: MAST Road Safety Database (2016)

Figure 3 below shows the percentage of junction crashes by the control type of the junction. The findings are similar across the areas compared to, showing that the overwhelming majority of crashes at junctions occur at junctions where the driver has a greater level of decision-making. This is consistent with data on contributory factors to crashes that show failing to observe and judge other traffic are major factors in crashes.

Figure 3 - Percentage of *junction crashes* by junction control type for North East Lincolnshire, other Humber authorities combined, statistical neighbours combined and England, 2011-2015



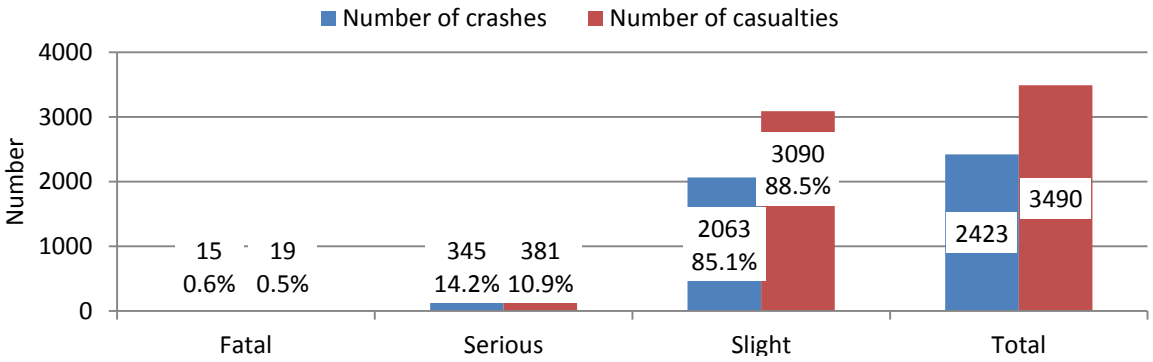
Source: MAST Road Safety Database (2016)

Crash and casualty severity

The severity of a crash is determined by the most severe casualty sustained from that crash. For example, a crash resulting in two slight injuries and one serious injury would be a serious crash.

Casualty severity is independent of the severity of the crash and other casualties, as each casualty is counted individually.

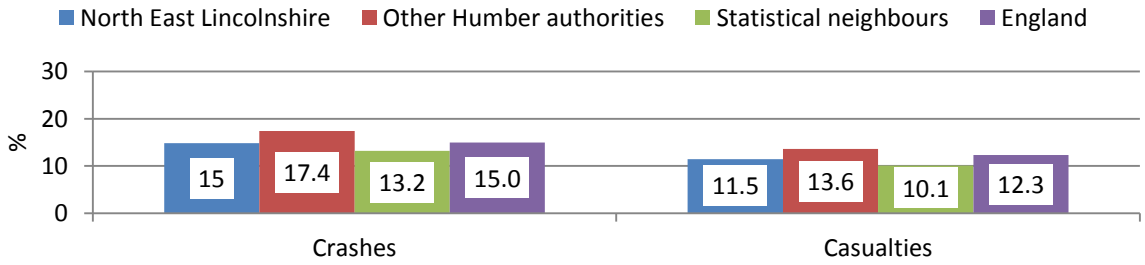
Figure 4 – Number and percentage of crashes and casualties by severity, North East Lincolnshire, 2011-2015



Source: MAST Road Safety Database (2016)

Figure 4 above shows numbers and percentages of crashes and casualties by severity. The combined percentage of *crashes* considered fatal or serious and the combined of percentage of *casualties* considered fatal or serious – 14.9% and 11.5% respectively – is broadly in line with other areas compared to, as Figure 5 below shows

Figure 5 – Percentage of crashes and casualties classified as fatal or serious in North East Lincolnshire, the other Humber authorities, statistical neighbours and England, 2011-2015



Source: MAST Road Safety Database (2016)

KSI (Killed and seriously injured) rates

The rate of casualties killed and seriously injured is an indicator on the DfT's *Road Safety Framework*[1] and is a commonly reported statistic elsewhere, including Public Health England's *Public Health Outcomes Framework*[2].

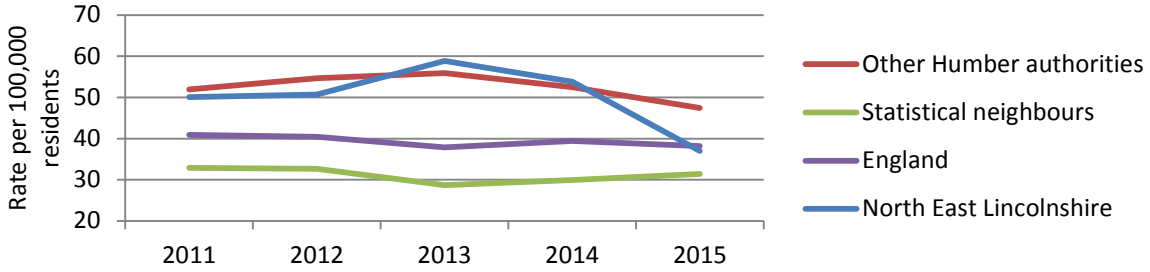
It is calculated by dividing the number of casualties killed or seriously injured by the population at risk of being killed or seriously injured, and then multiplying the result by 100,000 to find the rate per 100,000 people at risk. The people at risk are taken to be the entire population of an area. For a pooled rate over a number of years – such as how Public Health England display the KSI rate – the number at risk is multiplied by the number of years the casualty data is taken from.

Due to the need for the DfT to verify the accuracy of crash statistics and Public Health England's use of a three-year pooled rate, Public Health England's data lags slightly behind,

[1] Department for Transport (2011) *Strategic Framework for Road Safety*
[2] Public Health England (2016) Public Health Outcomes Framework – KSI rates

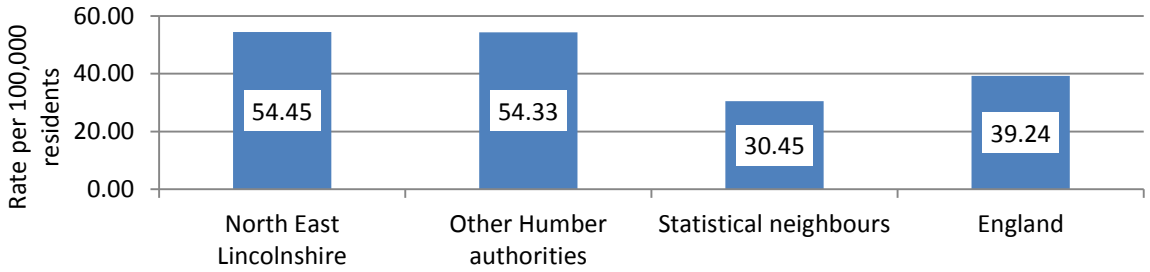
currently showing the three-year figure for 2013-2015. Figure 6 below shows the year-on-year KSI rate, and Figure 7 - also below - shows the five-year KSI rate (2011-2015).

Figure 6 – All ages KSI rate for North East Lincolnshire, other Humber authorities, statistical neighbours and England, 2011-2015



Source: MAST Road Safety Database (2016), Office for National Statistics (2016)

Figure 7 - Five year KSI rate for North East Lincolnshire, other Humber authorities, statistical neighbours and England, 2011-2015



Source: MAST Road Safety Database (2016), Office for National Statistics (2016)

Figure 6 demonstrates that whilst KSI rates have more-or-less stagnated nationally and amongst North East Lincolnshire's statistical neighbours, there has been improvement across the rest of the Humber region and within North East Lincolnshire itself – North East Lincolnshire's KSI rate was 26% lower in 2015 than it was in 2011. This fall in the KSI rate represents approximately 25 fewer fatalities or serious injuries in 2015 compared to the 2011-2014 average.

Provisional data from Engie based on the first ten months of 2016, which has not yet been verified suggests that the KSI rate for 2016 could be as low as 27.6/100,000 which would be a considerable reduction on the long-term trend.

Child KSIs

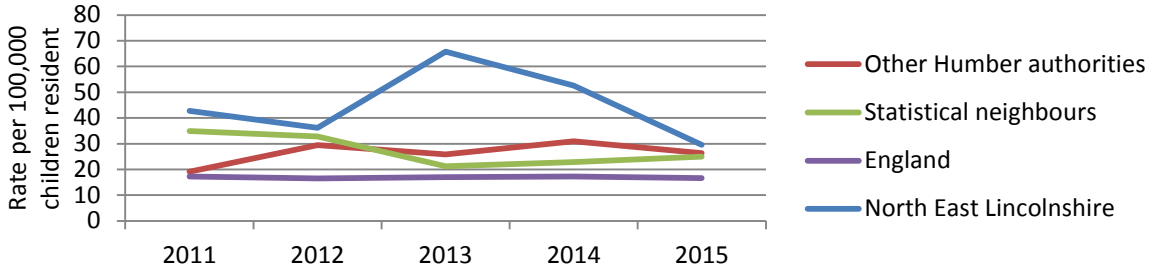
Road traffic incidents are a major cause of death and injury amongst children, which not only results in preventable loss of life or injury, it also results in parents restricting opportunities for their children to walk or cycle, thereby reducing physical activity[3]. Figure 8 overleaf shows the child KSI rate over time.

North East Lincolnshire has long had a rate above that of other Humber authorities, our statistical neighbours and England, and this continues to be the case. However, the rate has

[3] Public Health England (2016) *Child Health Profiles*

reduced since 2013. Provisional data from Engie for 2016 indicates that the rate will rise again this year however, to approximately 42.9/100,000.

Figure 8 - Child KSI rate for North East Lincolnshire, other Humber authorities, statistical neighbours and England, 2011-2015



Source: MAST Road Safety Database (2016), Office for National Statistics (2016)

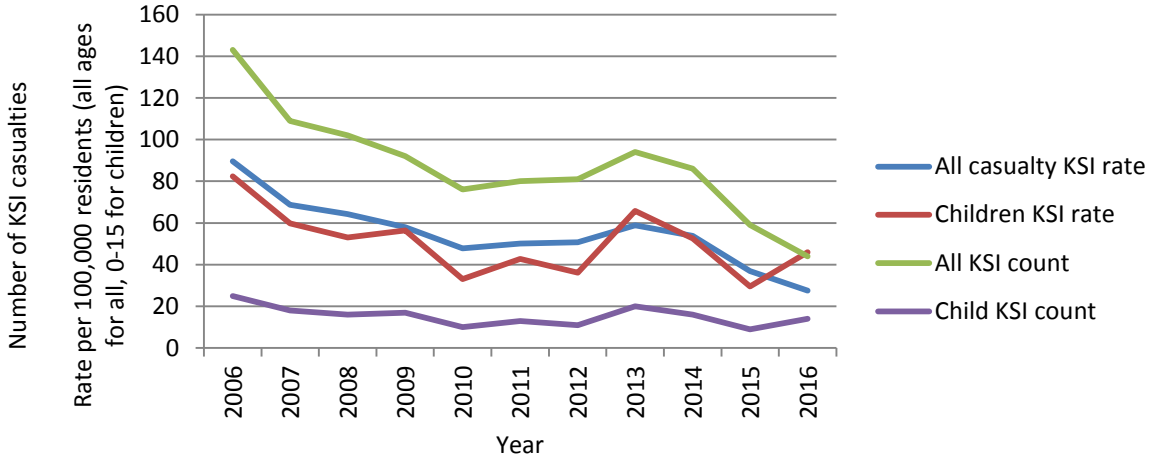
See Technical Appendix A for data tables showing KSI statistics for all ages in North East Lincolnshire from 2005.

KSIs in context

Figure 9 below shows the number and rate of KSIs by year from 2006, in order to demonstrate the recent historical context of KSIs. As can be seen the total number of KSIs has fallen considerably since 2006, to rise again in 2013 and fall again by 2016[4]. Overall, KSIs for all ages have been reduced by 69% with a 44% reduction in child KSIs.

It is notable that in the period 2011-2015, North East Lincolnshire's KSI rate was driven mostly by serious injuries, as the fatality rate for North East Lincolnshire was lower than nationally (2.38 fatalities per 100,000 residents locally to 2.76 fatalities per 100,000 residents nationally). Likewise the rate of serious casualties was higher locally than nationally.

Figure 9 – Number of, and rate of, KSIs by age group for North East Lincolnshire, 2006-2016, with estimated figures for 2016 based on Q1, Q2 and Q3 KSI data.



Source: North East Lincolnshire Council/Engie (2017)

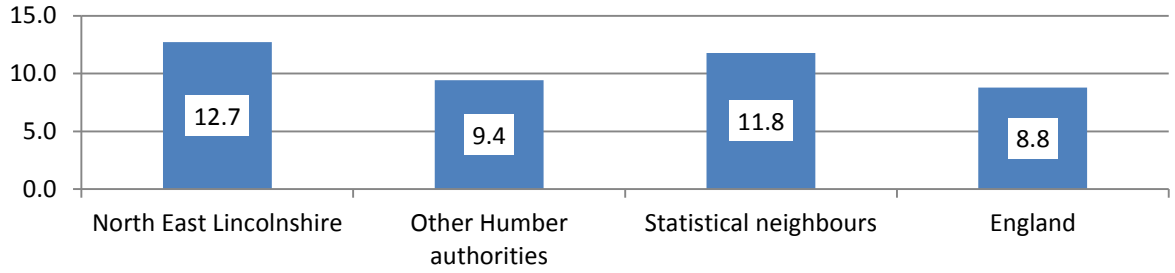
[4] 2016 KSI estimates are calculated by multiplying the average number of KSIs from January to October by 12.

Casualty age and gender

Child casualties

Of the 3,490 casualties arising from 2,423 crashes in North East Lincolnshire between 2011 and 2015, 444 were children, representing 12.7% of all casualties within this period. This is higher than most other local authorities and is higher than the figures for the rest of the Humber region, statistical neighbours and England respectively, as demonstrated below in Figure 10. There is little difference in the percentage of the population that are children between the areas compared.

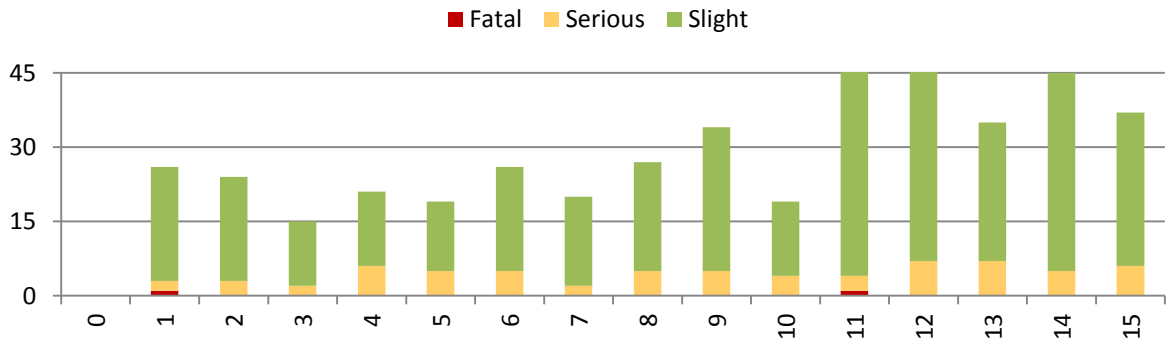
Figure 10 - Percentage of all casualties that were children for North East Lincolnshire, other Humber authorities, statistical neighbours and England, 2011-2015



Source: MAST Road Safety Database (2016)

Figure 11 below shows the number of children injured by single year of age and by severity of the casualty. The chart shows three major things. First, there are few fatalities. Conflating fatalities and serious injuries into one rate can give the impression that there is a high rate of both, but this is not true. The vast majority of those *killed or seriously injured* are actually the latter. Second, the number of serious injuries by single year of age does not increase much by age. Third, the number of slight injuries increases considerably with age, and it is these injuries that are most common. The average number of slight injuries for children aged 1-10 is 19. It is 37 for children aged 11-15.

Figure 11 - Number of child casualties by single year of age and casualty severity, North East Lincolnshire, 2011-2015



Source: MAST Road Safety Database (2016)

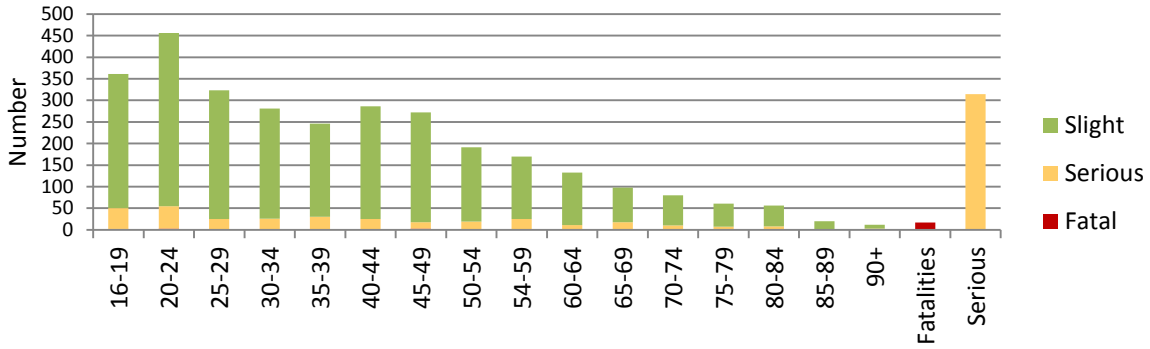
Using mid-year, single year of age estimates[5], it is possible to calculate rates for single years of age. Doing so eliminates the possibility that greater numbers of casualties are caused by population differences. A clear spike in the rate of serious and slight casualties respectively is shown at age 11, despite a considerable drop in the rate of slight injuries at age 10.

It is not clear what causes this increase in both the numbers and rates of casualties at age 11. However, it is reasonable to assume that since children start secondary school at 11, and that secondary schools are generally further away than primary schools, children are spending a greater length of time travelling to school either by car, bus, bike or foot and are thus at greater risk than primary school students. Analysis of child – and adult – casualties by method of transport explores this in further detail in the later section on casualty method of transport, and analysis of casualties by the time of day (including peak school and commuting times) is in the later section on casualties by time of day.

Adult casualties

Out of the 3,490 casualties arising from 2,423 crashes between 2011 and 2015, 3,046 were adults, representing 87.3% of casualties during this period. Figure 12 below shows the number of adult casualties by five-year age group and by severity.

Figure 12 – Number of adult casualties by five-year age band and severity, North East Lincolnshire, 2011-2015



Source: MAST Road Safety Database (2016)

Due to the small number of fatalities in total (17) it is difficult to show them on a graph such as the above. However just under two-thirds (11, 64.7%) of fatalities occurred in under 50s, and just under a third (5, 29.7%) in under 25s.

In contrast to children, the number of casualties decreases by age. This is likely due to a number of factors, most notably greater experience using the roads both as a road user and pedestrian. The issue of young and inexperienced drivers is explored in the next section on young drivers.

As above, the method of transport being used by adults will be explored in later sections, as will the time of day, day of week and month of year.

[5] North East Lincolnshire Informed (2016) *Population estimates (Single year of age)*

Young car drivers

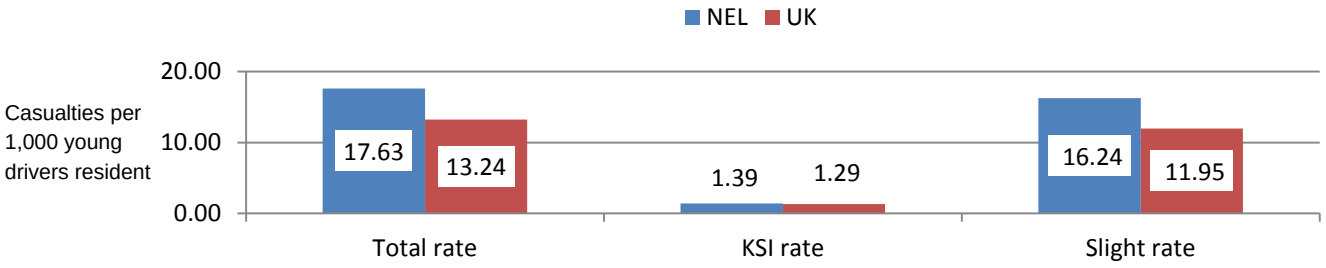
Young drivers generally refer to car drivers under the age of 25, regardless of how long they have held their license. For example, a young driver aged 24 could have held their license and been driving regularly for over 6 years. The database used to present statistics in this report counts drivers aged *25* as a young driver. The following statistics are based on drivers aged 17 to 25.

There is a great deal of focus on young drivers from road safety professionals, government, law enforcement and other emergency services. This is because young drivers are known to be "statistically over-represented" in car accidents[6], particularly those that are fatal or serious[7].

Between 2011 and 2015, there were 551 crashes in North East Lincolnshire involving a young car driver, resulting in 824 casualties, representing 22.7% of all crashes and 23.6% of all casualties. Both these figures are marginally above the national figure and lower than the rest of the Humber and statistical neighbours respectively.

It is possible to express these casualties as a rate, but not compared to local authorities due to the way in which DVLA data is collected. Further, the young car driver related casualty rate relies on a considerable degree of estimation, which is explained in Technical Appendix A. Figure 13 below shows the estimated rate of young car driver related casualties by severity, for North East Lincolnshire compared to the United Kingdom.

Figure 13 – Estimated rate of young car driver related casualties by severity for North East Lincolnshire and the United Kingdom, 2011-2015



Source: MAST Road Safety Database (2016), DVLA (2016)

These rates suggest that per each young car driver, there are more casualties than the United Kingdom as a whole. However this is reliant on a number of factors:

- That the young drivers who have given their postal town as Grimsby, Cleethorpes or Immingham did so correctly
- That the young drivers driving here, and being involved in crashes and casualties here are those registered as living here
- That the estimation itself is correct.

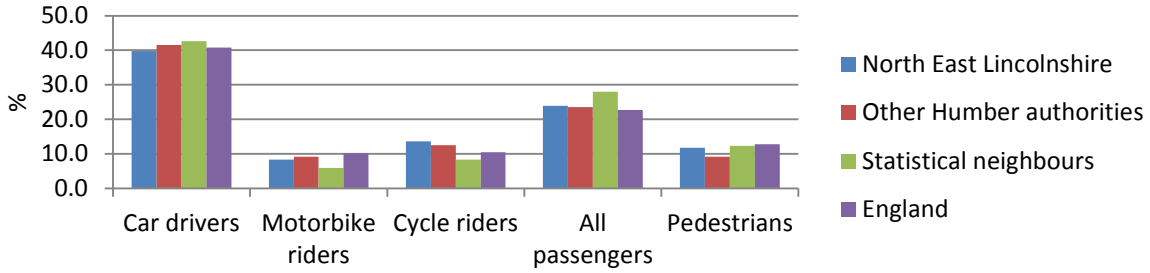
[6] Department for Transport/Office for National Statistics (2015) *Facts on Young Car Drivers*
[7] Department for Transport (2012) *Reported road accidents involving young car drivers: Great Britain 2011*

This warrants further exploration in order to determine whether or not this figure is accurate and what that means for young car drivers in North East Lincolnshire.

Casualty method of transport

Figure 14 below shows the distribution of all casualties by method of transport. Omitted from the chart – but not the total – are casualties to drivers of buses and goods vehicles[8] as well as 'other' vehicles[9], but not passenger or pedestrian casualties arising from those. Whilst the percentage of car driver, motorbike rider, passenger and pedestrian casualties is in line with the national figures, the proportion of cyclists injured is higher than all areas compared to.

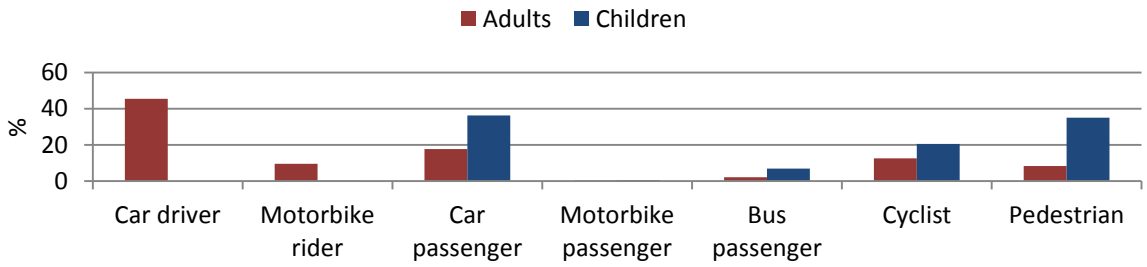
Figure 14 – Percentage of all casualties injured, by casualty mode of transport for North East Lincolnshire, other Humber authorities, statistical neighbours and England, 2011-2015



Source: MAST Road Safety Database (2016)

Figure 15 below shows the percentage of casualties by age group and method of transport for North East Lincolnshire. Given that most children do not have access to drive a motorbike or car, child casualties are proportionally greater in passenger and non-vehicular groups. With adults, the reverse is seen, and casualties are proportionately greater in vehicular groups.

Figure 15 – Percentage of casualties by age group and method of transport



Source: MAST Road Safety Database (2016)

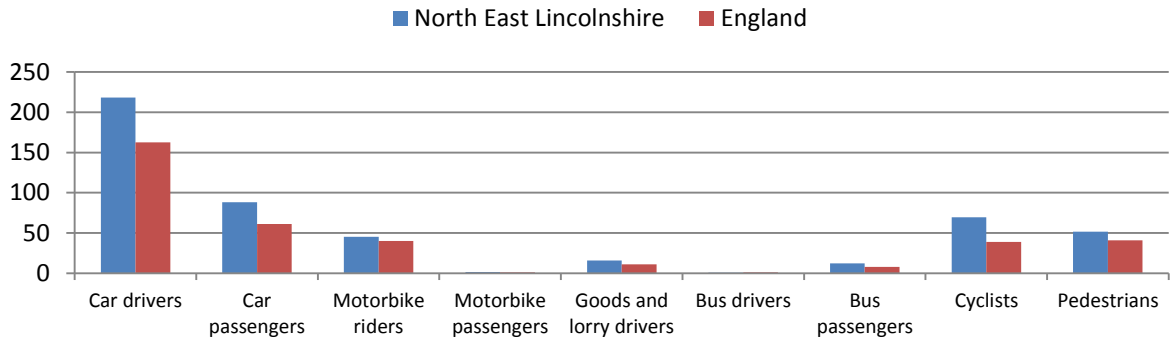
Casualty rates by method of transport

Figure 16 below shows casualty rates by method of transport for North East Lincolnshire, compared to England. Casualty rates are all per 100,000 residents and have been partially adjusted for age:

[8] Omitted due to low numbers
[9] Casualties arising from 'other' vehicles include those from horses, tractors, mobility scooters and other – not specified.

- Car drivers – casualties per 100,000 of the population aged 17+
- Motorbike riders – casualties per 100,000 of the population aged 16+
- Goods and lorry drivers – casualties per 100,000 of the population aged 17+
- Bus drivers – casualties per 100,000 of the population aged 21+
- Cyclists – casualties per 100,000 of the population aged 5-75
- Pedestrians – casualties per 100,00 of the population of all ages
- Passengers – casualties per 100,000 of the population of all ages

Figure 16 – All severity casualty rates per 100,000 of the appropriate age group, for North East Lincolnshire and England, 2011-2015



Source: MAST Road Safety Database (2016)

Figure 16 shows that North East Lincolnshire has higher casualty rates in each casualty category with the exception of bus drivers. However, some of these differences are marginal. There is little difference between North East Lincolnshire and England in motorbike casualties; goods and lorry driver casualties; bus driver casualties or bus passenger casualties. However, there are clear differences in car driver casualties, car passenger casualties, cyclist casualties and pedestrian casualties.

The reason for limiting the 'at-risk' population for some age groups is to better reflect the age structure of the areas used in the comparison. For example, a proportionally larger population of children would skew a rate relevant only to the adult population (car drivers) whilst a proportionally larger population of elderly people would skew a rate relevant only to the younger population, such as cyclists. The age groups were chosen on the grounds that a) in some cases it is not legally permitted for someone outside of the age group to drive a vehicle in that group, b) in some cases it isn't permitted by policy for someone outside that age group to drive a vehicle and c) it is unlikely that someone outside that age group would be using that method of transport.

A focus on cyclists

As a percentage of all casualties, North East Lincolnshire has a higher percentage of cyclist casualties than all other areas compared to, particularly compared to statistical neighbours and nationally. North East Lincolnshire also has a demonstrably higher casualty rate amongst cyclists compared to England.

Table 1 below shows the rate of cyclist injuries per 100,000 of the population aged 5-75[10], by local authority and ranked by the highest rate. Omitted from this table are London boroughs. North East Lincolnshire is the highest ranked local authority not to be either a) a London borough, b) border London (e.g. Mole Valley and Elmbridge – both Surrey) or c) have a university within or immediately nearby (e.g. Cambridge, Oxford, Portsmouth, Hull, York, Norwich, Bournemouth, Worthing, Brighton). This makes North East Lincolnshire's high rate of cycling casualties of greater interest as two factors present in other authorities – a high level of urbanisation and a student population – are absent. However it is known that rates of cycling in North East Lincolnshire are relatively high compared to similar areas and reflect the relatively low rates of car ownership, the fact that many residents of the Borough also work within the Borough and the small size and topography of the Borough.

Table 1 – Number and rate of cyclist casualties amongst the 5-75 year old population, ranked by rate, for selected local authorities – London boroughs omitted.

Local authority	Cyclist casualties	Five-year pop (5-75)	Rate per 100,000
Cambridge City	1044	562050	185.7
Oxford City	869	686890	126.5
Portsmouth City	928	906620	102.4
Kingston upon Hull City	1011	1118100	90.4
York City	753	881070	85.5
Norwich City	500	590065	84.7
Bournemouth Borough	682	807520	84.5
Mole Valley District	290	365895	79.3
Elmbridge Borough	430	559250	76.9
Worthing Borough	336	444735	75.6
Brighton and Hove City	899	1230880	73.0
North East Lincolnshire	469	684170	68.6

Source: MAST Road Safety Database (2016), Office for National Statistics (2016)

Age, gender and socio-economic status

91 of 475 (19.2%) cyclist casualties were children, ranging in age from 6 to 15. This is considerably higher than both the other Humber authorities (11.9%) and England (10.8%) but in line with statistical neighbours (20.6%).

The oldest cyclist injured was 82. The age distribution of cyclists is skewed towards younger ages, with 57.7% of cyclists being aged 6-34 at the time of the crash. The greatest number of crashes within each five-year age group was amongst 11-15 year olds, with 69 injuries. This is due to a large increase in the number of cycling injuries as children reach secondary

[10] Whilst cyclist casualties do occur to individuals over the age of 75, including in North East Lincolnshire, research indicates that very few cyclists are aged over 75. To include the over 75 population would be to further skew the rate.

school age – only five children aged 10 were injured whilst riding a pedal cycle, compared to 16 children aged 11, a figure 3.2 times bigger. This is likely due to greater independence coming with age, cycles being given as gifts, the need to travel to a larger school further away from the family home due to the more centralised nature of secondary teaching, and relative inexperience navigating the roads as a road user, rather than as a pedestrian.

The potential of a road safety education issue in the area seems less likely given that a) Engie have delivered road safety sessions to thousands of school pupils in recent years and b) Bikeability sessions are delivered by Lincs Inspire.

Bikeability is a cycling proficiency course funded wholly or in-part by the Department for Transport and delivered at low, or no cost, via schools and/or other organisations (e.g. Lincs Inspire), to children and adults. There are several proficiency levels and Lincs Inspire have delivered 'Level 3' sessions "aimed at cyclists who may need to navigate heavier traffic" in secondary schools[11].

Throughout the life course, males are injured considerably more frequently whilst riding a pedal cycle than females. This is a pattern seen across the country. Approximately 80% of North East Lincolnshire's cyclist casualties are male. This could be due to a number of factors, such as research findings that boys take more risks than girls[12], bikes being a stereotypically 'male' gift, and the general finding that the majority of cyclists are men, with women opting for different methods of transport.

Junctions, lanes and overtaking

Despite there being only 475 cyclist casualties, there have been 484 crashes involving cyclists, suggesting that there are a number of crashes where cyclists are involved but not themselves injured.

Of these 484 crashes, just under three-quarters (74.4%) took place at junctions, a figure in line with the other Humber authorities (76.1%), statistical neighbours (77.1%) and England (75.9%). A plurality (31.8%) of cyclist crashes in North East Lincolnshire took place on T or staggered junctions.

Junctions can present particular hazards to cyclists, especially where they are required to turn right across the traffic and unsurprisingly there were five times as many cyclists injured whilst turning right than left, with 50 cyclists injured making a right turn and 10 cyclists injured making a left turn. In total, 10.5% of cyclists were injured at a right turn, twice as many (proportionally) as England.

23 (4.8%) cyclist casualties took place on cycle paths, 16 (3.37%) took place on footpaths and 91.8% took place on roads.

23 (4.8%) cyclist casualties took place whilst the cyclist themselves was overtaking a vehicle. 7 of these casualties arose whilst overtaking a vehicle from the nearside (the side closest to the kerb), whilst the remaining 16 arose whilst overtaking a vehicle from the

[11] Lincs Inspire (2016) *Bikeability*
[12] Morrongiello and Rennie (1998) *Why do boys engage in more risk taking than girls? The role of attributions, beliefs, risks and appraisals*

offside (the driver's side in a right-hand drive car). 15 of these 16 cases involved a stationary car.

Number and type of vehicles

Single-vehicle crashes are those in which there is only one vehicle involved. There were 831 casualties arising from single-vehicle crashes across all methods of transport, almost half of whom (46.3%) were pedestrians.

In cyclist-specific single-vehicle crashes, 21 cyclists were injured, 8 seriously and 13 slightly. 443 cyclists were injured in two-vehicle crashes, in most instances, these were cars however, 36 cyclists were injured in crashes with goods vehicles (23 of which light goods vehicles), 7 cyclists were injured in crashes involving motorcyclists and 2 cyclists were injured in crashes with buses. A small number were injured in crashes with 3 or more vehicles.

Pedestrian casualties of cyclists

By isolating crashes involving pedal cyclists and only one vehicle, it is possible to see the pedestrian casualties of cyclists. In total, of 411 pedestrian casualties, 7 (1.7%) were from a collision involving a pedestrian and a cyclist, 1 of which was serious and 6 slight. 4 of these casualties took place on footpaths, and 3 involved children.

Crash locations

Cyclist casualties cluster like other casualties around meeting points in the road. As previously mentioned, just under three-quarters of cyclist crashes were at junctions. However, some junctions appear to stand out more than others, in particular Fiveways Roundabout and Nun's Corner Roundabout.

Crash severities

Of 475 cyclist casualties, three resulted in fatalities. 64 were classed as serious and the remaining 408 slight.

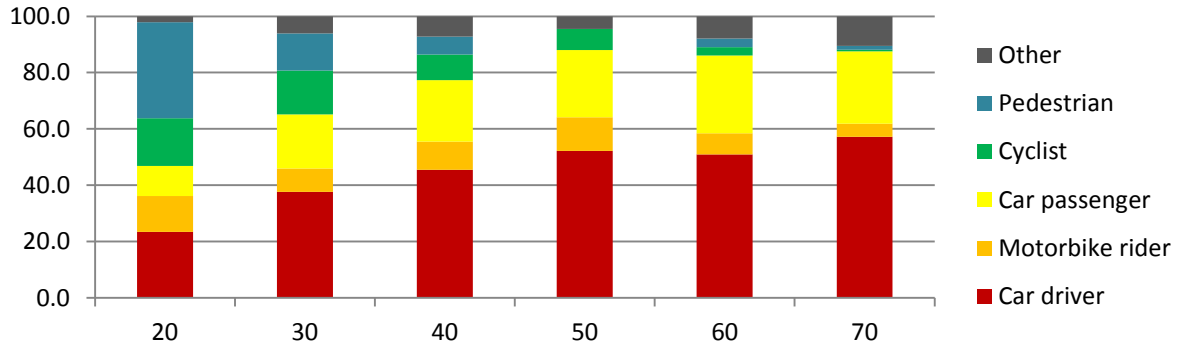
Speed limit and rurality

2,849 of 3,490 (81.6%) of casualties occurred in 30mph zones. This is almost 20 percentage points higher than the value for England, where 61.8% of casualties occurred in 30mph zones, and is one of the highest values in England, excluding the London boroughs.

It is perhaps simply a reflection of the road network of North East Lincolnshire; however at present it is unknown what proportion of North East Lincolnshire's roads are 30mph zones. Further data on the composition of North East Lincolnshire's road network by speed is required for deeper analysis.

Figure 17 below shows the proportion of casualties by method of transport, by speed limit in North East Lincolnshire. As might be expected, casualties in high-speed areas where there are fewer residential areas are mostly those in a vehicle, with car drivers and car passengers being most prominent. In low speed residential areas, especially 20mph zones, pedestrians make up a greater proportion of casualties.

Figure 17 – Proportion of casualties within each speed limit by method of transport of casualty, North East Lincolnshire, 2011-2015



Source: MAST Road Safety Database (2016)

The percentage of casualties killed and seriously injured is also influenced by speed limit. Approximately 11.5% of casualties in total were killed or seriously injured. In 20, 30, 40, 50 and 70mph zones, the percentage of casualties killed or seriously injured is around this figure (10.2% - 12.8%) however in 60mph zones, 24.9% of casualties were killed or seriously injured. 97.7% of casualties in 60mph zones were in rural areas, and 60mph roads are predominantly rural roads. Figures from the RAC[13] suggest that 25% of drivers have seen a near-miss collision on a rural road, 35% admit to taking a blind bend too quickly and 40% have been surprised by unexpected road users, such as horse riders. More than two-fifths (43%) admit to breaking the speed limit on 50mph and 60mph country roads and 8% admit to doing so 'frequently'[13].

Children are overrepresented in casualties in 20mph and 30mph zones, and underrepresented in all other speed zones. Conversely, adults are overrepresented in 40mph, 50mph, 60mph and 70mph speed zones. This is not unexpected given that 20mph and 30mph zones are more likely to be areas in which non-vehicular road users are to be found such as child pedestrians or cyclists.

[13] RAC (2014) *Rural roads most dangerous in UK*

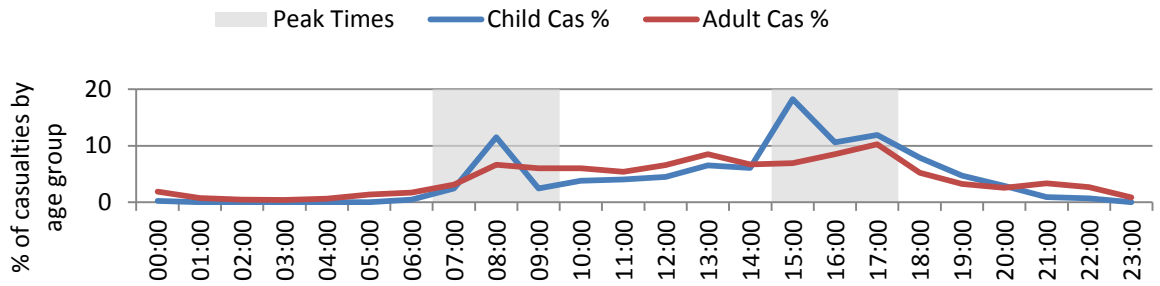
Please see Technical Appendix A for data on estimated free-flow traffic speeds for *cars* by speed limit. This data is not specific to North East Lincolnshire but has been collected by the DfT nationally.

Casualties by time of day, day of week, month of year and impact of weather

Time of day

It is well-established that the peak times for traffic volume – rush hour – result in spikes in the number of casualties, and North East Lincolnshire is no exception to this. Nearly half (1,519, 43.5%) of North East Lincolnshire's total casualties between 2011 and 2015 occurred between 07:00-09:59[14] and 15:00-17:59[15] respectively.

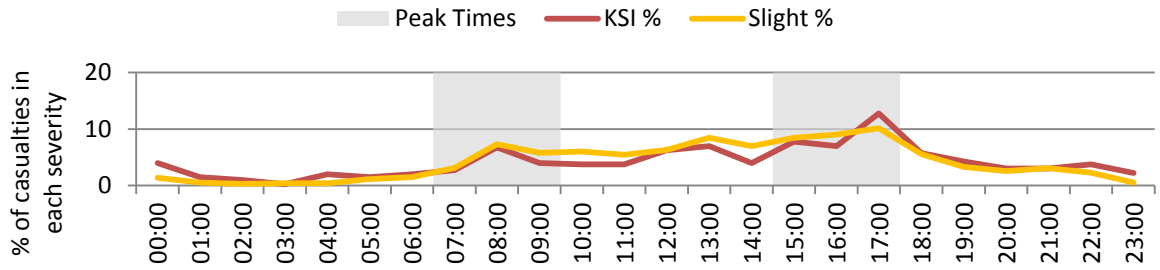
Figure 18 – The percentage of casualties within each age group, injured by hour of day, North East Lincolnshire, 2011-2015



Source: MAST Road Safety Database (2016)

Correspondingly, there are also spikes in the proportion of KSI casualties during these hours. Of the 400 casualties killed or seriously injured, 41% (164) were injured during the morning or evening rush.

Figure 19 – The percentage of casualties within each severity group, injured by hour of day, North East Lincolnshire, 2011-2015



Source: MAST Road Safety Database (2016)

Day of week

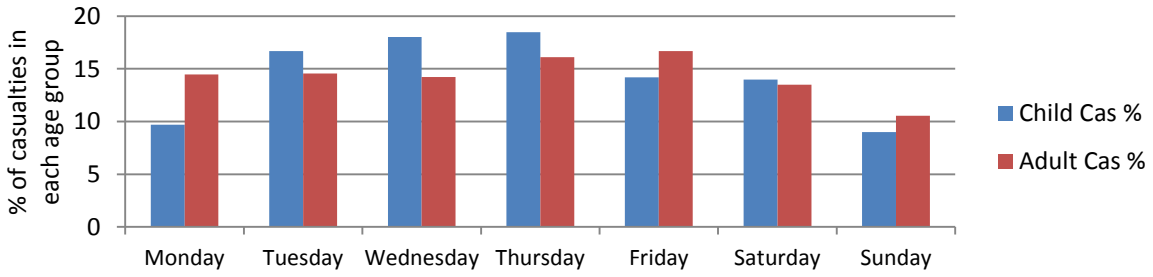
Across England as a whole, the greatest number of casualties occur on a Friday. This is in line with traffic flow data for Great Britain[15], which suggests Friday is also the busiest day. In North East Lincolnshire, Thursday had the greatest number of casualties (372) but just one more than Friday. Friday saw the greatest proportion of adult casualties on any single day,

[14] Department for Transport (2013) *Road congestion and travel times*
[15] Department for Transport (2016) *Road Traffic Estimates: Great Britain 2015*.

whilst Thursday saw the greatest proportion of child casualties. This is displayed below in Figure 20.

It would make sense for child injuries to be patterned mostly by the school week; however, child casualties are lowest on Monday and Sunday, rather than Saturday and Sunday.

Figure 20 – The percentage of casualties within each age group, by day of week, North East Lincolnshire, 2011-2015

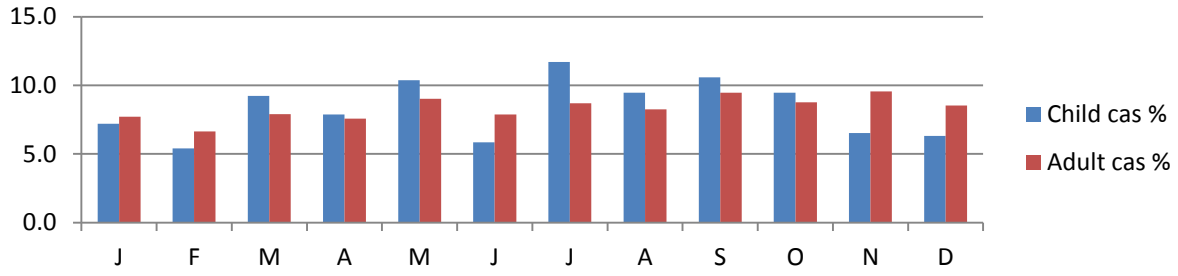


Source: MAST Road Safety Database (2016)

Month of year

Traffic flow data[15] suggests that traffic flow in Great Britain is lowest in January and highest in July. In particular, the summer months see a much greater flow of motorbikes and pedal cycles than the winter months. In North East Lincolnshire, casualties per month tend to increase throughout the year until September (Figure 21).

Figure 21 – The percentage of casualties within each age group, by month, North East Lincolnshire, 2011-2015



Source: MAST Road Safety Database (2016)

Weather

Weather has a clear impact on driving, creating additional hazards for drivers during and after adverse weather such as high winds, precipitation and ice. Between 2011 and 2015, of 2,706 casualties *attended by police*, 346 (12.8%) were recorded to have happened *during* bad weather conditions, such as rain (258), wind (77), snow (22) and fog (16)[16].

744 casualties (27.5%) were recorded to have happened with poor road conditions, such as wet or damp roads (676) frosty or icy roads (48) and snowy roads (20). 309 casualties (11.4%) occurred with both bad weather and poor road conditions as contributory factors.

[16] Numbers do not add up to 346 as more than one weather condition could be present at any time, e.g. rain and wind or snow and fog.

Casualties by socio-economic status

There is a recognised association between low income (i.e. income deprivation) and risky behaviour on the roads, such as speeding, driving intoxicated, failing to wear seat-belts and driving uninsured[17]. In addition to this, children from lower income backgrounds have considerably higher pedestrian and cycling fatality rates, mainly associated with the fact that they live close to some of the more dangerous roads[18].

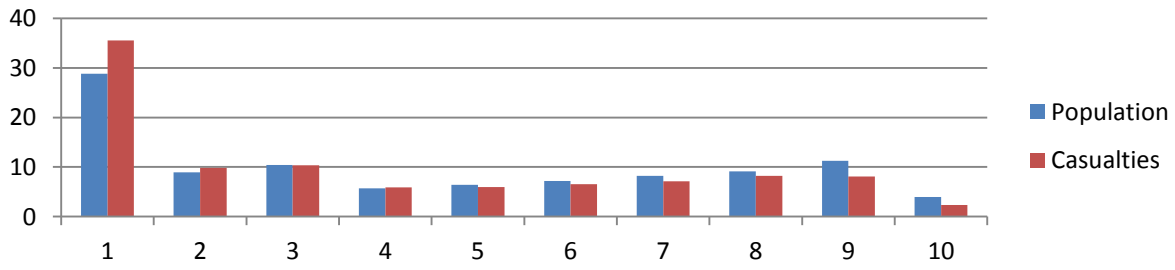
Data from MAST allows for analysis by deprivation, but this is not a perfect science. Deprivation is above all else, patterned geographically, and to determine the deprivation quartile and decile, postcodes are used. All of the data presented in this section looking at socio-economic status considers only casualties resident within North East Lincolnshire, involved in collisions within North East Lincolnshire.

Figure 22 below shows how the percentage of the population and percentage of casualties are distributed by index of multiple deprivation decile.

It shows that for the total population, 28.8% of North East Lincolnshire's population live within lower-layer super output areas[19] (LSOAs) that are in the 10% most deprived nationally, and that 35.5% of North East Lincolnshire's casualties live within those LSOAs. If each casualty is unique, that is within the five-year period, each casualty was a different person, then this would suggest that the total population who live in those LSOAs are 1.36 (95% CI 1.26-1.47) times more likely to be a traffic casualty than those in the other nine deciles.

North East Lincolnshire has one of the highest percentages of casualties from the lowest income decile in England. This may be expected given the fairly high percentage of the population within that income decile. However, the overrepresentation of casualties living in those income deciles is suggestive of a relationship between deprivation and casualties arising from road traffic incidents locally.

Figure 22 – Distribution of North East Lincolnshire's population and road traffic casualties by income deprivation decile, with 1 being the most deprived nationally



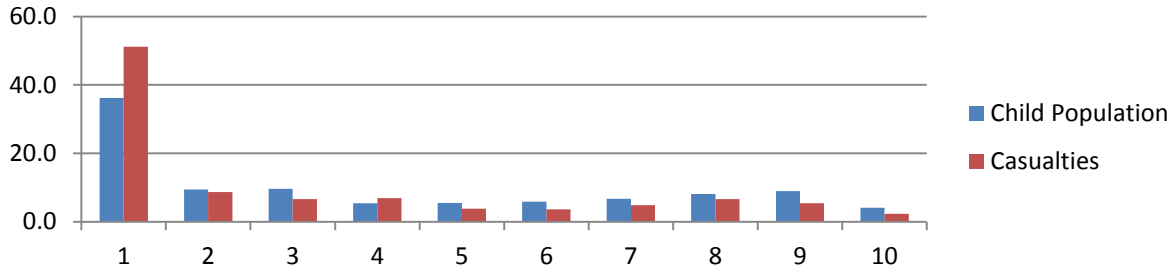
Source: MAST Road Safety Database (2016)

Figure 23 below shows the same analysis as above, for the child population resident within North East Lincolnshire at the time of the collision. It shows that a majority of casualties

[17] Clarke, Ward, Truman and Bartle (2008) *A poor way to die: social deprivation and road traffic fatalities.*
[18] Child Accident Prevention Trust (2013) *Making the link: Inequalities and deprivation*.
[19] Small geographical areas determined from census data containing approximately 1,000 residents

(51.2%) were children who live in LSOAs that are in the 10% most deprived nationally, despite only 36.2% of the child population living within those LSOAs. Again, if all casualties are unique, then this would suggest that children who live in those LSOAs are 1.84 (95% CI 1.51-2.25) times more likely to be a traffic casualty than children in the other nine deciles.

Figure 23 – Distribution of North East Lincolnshire's child population and child road traffic casualties by income deprivation decile, with 1 being the most deprived nationally

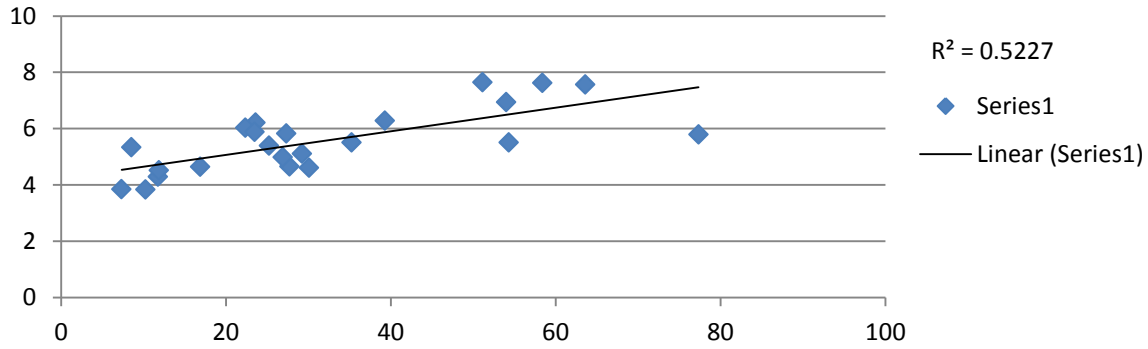


Source: MAST Road Safety Database (2016)

Additionally there is a correlation between the multiple deprivation index (taking into account all forms of deprivation, not just income) and the rate of casualties *from* an area – but not *within* an area. What this means is that an individual's deprivation status can be seen as a predictor of being involved in a road traffic incident.

Analysis of North East Lincolnshire's 23 middle-layer super output areas[20] (Figure 24) suggests that as the deprivation score of an area increases, as does the casualty rate of the residents who live there.

Figure 24 – Correlation between MSOA average index of multiple deprivation score and rate of road casualties among residents, per 1,000, 2011-2015



Ward-by-ward analysis

This section briefly presents how crashes and casualties are patterned across North East Lincolnshire, by ward. Far more detail on this is available in Technical Appraisal A This analysis was previously not possible using MAST and information presented at the road safety 'turning the curve' session was presented at the more granular middle-layer super

[20] Small geographical areas determined from census data containing approximately 5,000-10,000 residents

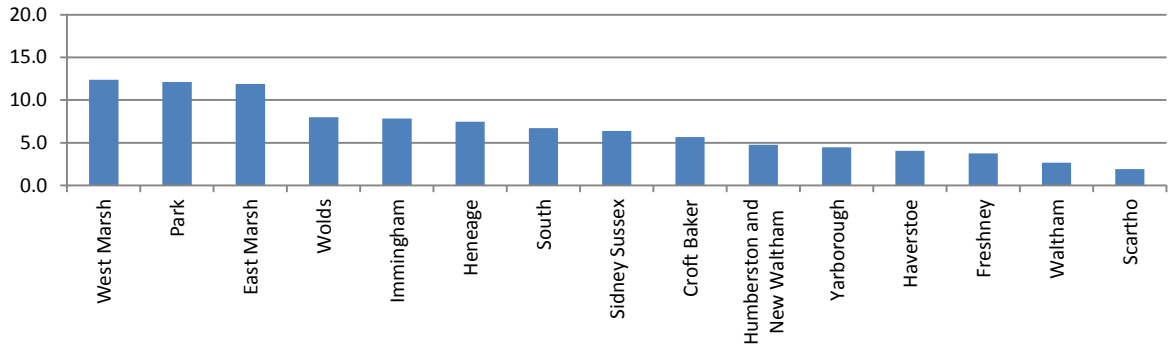
output area (MSOA) level. Whilst MSOA data is more geographically specific, MSOAs are not confined to electoral wards which are more frequently used when presenting data.

The charts here show the percentage of *all* North East Lincolnshire crashes or casualties by type, by ward. So for example, 12.4% of all casualties in North East Lincolnshire were in West Marsh, but just 1.9% in Scartho.

Casualties

West Marsh, Park and East Marsh have high numbers of casualties compared to the rest of North East Lincolnshire. More than a third (36.4%) of casualties were injured in those three wards. Whilst deprivation is undoubtedly an important factor behind the number of casualties in these wards, it is likely that such a high number of casualties stems also from the size of these wards and the areas covered. West Marsh covers two busy roundabouts on the A180 and part of the A16, East Marsh covers Freeman Street and Cleethorpe Road, and Park covers a large geographical area including Cromwell Road, Weelsby Road and Nun's Corner.

Figure 24 - Percentage distribution of all North East Lincolnshire casualties by ward



Source: MAST Road Safety Database (2016)

Mosaic

Mosaic is a tool developed by Experian which allows public sector organisations to view a more nuanced profile of the socio-economic characteristics of residents within their local area. These profiles break the population down into fifteen different categories based on income, housing status, location, consumption, debt and more, based on postcode data.

Data from MAST, which displays both casualties and related drivers by their Mosaic type shows that just under half of all casualties (48.4%) come from three of the most deprived groups: L, M and O. These groups are described as 'Single people privately renting low-cost homes for the short-term', 'Families with limited resource who have to budget to make ends meet', and 'Urban renters of social housing facing an array of challenges' respectively.

Conclusion

This report has highlighted that despite improvements in recent years the rate of casualties on roads in North East Lincolnshire is higher than in other comparable parts of the country. Rates are especially elevated amongst cyclists and people who live in more deprived communities in North East Lincolnshire who experience the most dangerous roads on a daily basis.

It is recommended that progress on road casualties should be monitored closely within the Council's new Outcome Based Accountability framework and that scorecards should be developed around the KSI rates for all ages and those specifically focused on children. It is also imperative that road casualty reduction strategies should be linked to wider public health strategies on active travel so that any improvements in road safety are not at the expense of people using active methods of transport such as walking and cycling to move around. Ideally we should be looking to develop transport systems which make people feel much safer about walking and cycling in North East Lincolnshire and investments should be focused on this in the future.

References

Reference number refers to in-text footnote number. N/A refers to footnotes that give explanations of methodology or terminology used.

1. Department for Transport (2011) *Strategic Framework for Road Safety*. Available online at <https://www.gov.uk/government/publications/strategic-framework-for-road-safety>
2. Public Health England (2016) *Public Health Outcomes Framework – KSI rates*. Available online at <http://www.phoutcomes.info/search/KSI#page/0/gid/1/pat/6/par/E92000001/ati/102/are/E12000004>
3. Public Health England (2016) *Child Health Profiles – KSI rates.* Available online at <https://fingertips.phe.org.uk/search/children%20killed#page/3/gid/1/pat/6/par/E12000003/ati/102/are/E06000012/iid/90804/age/169/sex/4>
4. N/A
5. North East Lincolnshire Informed (2016) *Population estimates (Single year of age)*. Available online at <http://www.nelincsdata.net/dataviews/view?viewId=357>
6. Department for Transport/Office for National Statistics (2014) *Facts on Young Car Drivers.* Available online at <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/306500/young-car-drivers-2012.pdf>
7. Department for Transport (2012) *Reported road accidents involving young car drivers: Great Britain 2011.* Available online at < https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/236989/young-drivers-2011.pdf>
8. N/A
9. N/A
10. N/A
11. Lincs Inspire (2016) *Bikeability.* Available online at <https://www.lincsinspire.com/enterprise/Sport_Bikeability>
12. Morrongiello and Rennie (1998) *Why do boys engage in more risk taking than girls? The role of attributions, beliefs, risks and appraisals.* Journal of Pediatric Psychology 23 (1) pp 33-43. Available online at <http://www.jpepsy.oxfordjournals.org/content/23/1/33.full.pdf>
13. RAC (2014) *Rural roads most dangerous in UK*. Available online at <http://www.rac.co.uk/drive/news/motoring-news/rural-roads-most-dangerous-in-uk/>
14. Department for Transport (2013) Road congestion and travel times*. Available online at <https://www.gov.uk/government*/collections/road-congestion-and-reliability-statistics>
15. Department for Transport (2016) *Road Traffic Estimates: Great Britain 2015*. Available online at <https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/524261/annual-road-traffic-estimates-2015.pdf>
16. N/A
17. Clarke, Ward, Truman and Bartle (2008) *A poor way to die: social deprivation and road traffic fatalities.* Available online at

<http://www.psychology.nottingham.ac.uk/staff/ddc/c8cxpa/further/CR_material/poorwaytodie.pdf>

18. Child Accident Prevention Trust (2013) *Making the link: Inequalities and deprivation*. Available online at <http://www.makingthelink.net/topic-briefings/inequalities-and-deprivation>
19. N/A
20. N/A