

# Child Road Safety and Poverty Research Project

Report for Department of the Environment Northern Ireland

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June 2011



## Document Control

Project Title: Child Road Safety and Poverty Research Project

MVA Project Number: C3A25400

Document Type: Final Report

Directory & File Name: J:\Contract\C3A25400.Cs Child Road Safety And Pverty NI\Final Report\FINAL Version\20110613 Final Report\_ FINAL.Doc

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## Distribution

Issue	Date	Distribution	Comments
1	13/04/2011	DoENI	Draft
2	31/05/2011	DoENI	Final draft
3	13/06/2011	DoENI	Final

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# 1 Introduction

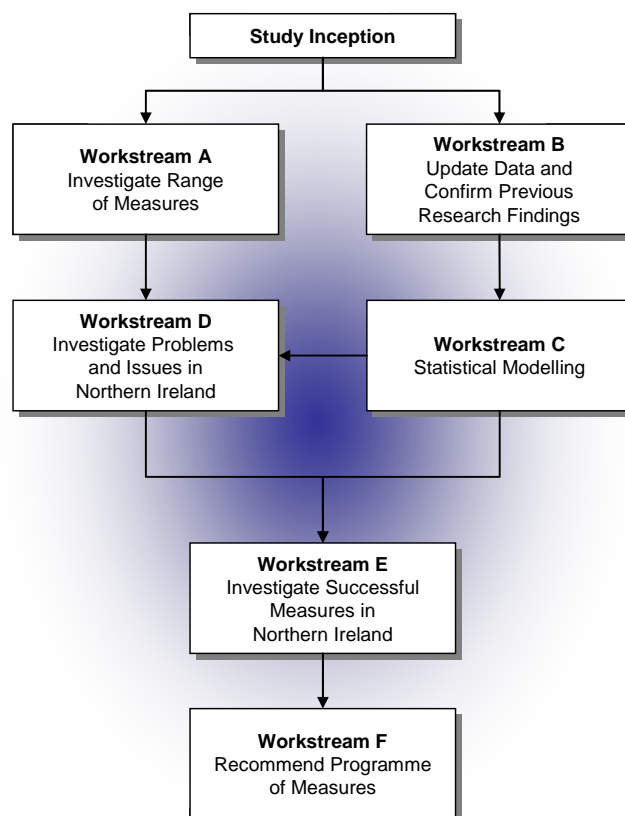
## 1.1 Introduction

1.1.1 The output of this research is a prioritised five year programme of measures which aim to reduce road collisions and casualties involving children in deprived areas of Northern Ireland. These measures complement the measures set out in the current Road Safety Strategy to 2020, recently published by the Department of the Environment.

1.1.2 Earlier research published by DOE in 2010<sup>1</sup> confirmed that there was a strong relationship between child pedestrian road casualties and areas of deprivation. This research has built upon those findings by undertaking further statistical modelling and practical qualitative investigations with stakeholders across Northern Ireland.

## 1.2 Research Methodology

1.2.1 A summary of the research methodology is provided in diagram form in Figure 1.1. This features the six separate Workstreams (A – F) and how they are inter-linked. More detailed descriptions of each workstream methodology can be found in the following chapters, and full descriptions in the technical notes which are provided in the appendices.



**Figure 1.1 Summary of Research Methodology**

<sup>1</sup> Colin Buchanan and Partners (2010) Deprivation and child pedestrian road casualties ([http://www.doeni.gov.uk/roadsafety/child\\_deprivation\\_final\\_report\\_120110\\_\\_2\\_.pdf](http://www.doeni.gov.uk/roadsafety/child_deprivation_final_report_120110__2_.pdf))

### 1.3 Structure of the Report

1.3.1 The primary content of this report is the recommended programme of measures provided in Chapter 8. However, to provide additional context, a summary of the findings of the multi-faceted approach used in formulating and evaluating the measures are also provided as follows:

- Chapter 2 - Statistical context and estimates of costs of casualties;
- Chapter 3 – Investigate Range of Measures;
- Chapter 4 – Update Data and Confirm Previous Research Findings;
- Chapter 5 – Statistical Modelling;
- Chapter 6 – Investigate Problems and Issues in Northern Ireland;
- Chapter 7 – Investigate Successful Measures in Northern Ireland; and
- Chapter 8 – Recommended Programme of Measures.

1.3.2 Detailed findings on each of these elements of the research can be found in the technical notes provided in the appendices.

## 2 Statistical Context

### 2.1 Total Northern Ireland Casualties

2.1.1 The number of casualties in Northern Ireland resulting from road collisions is presented in Table 2.1 for years 2003 to 2008. The figures are broken down by children (ages 0-15) and adults, showing that children regularly represent approximately 10% of casualty numbers.

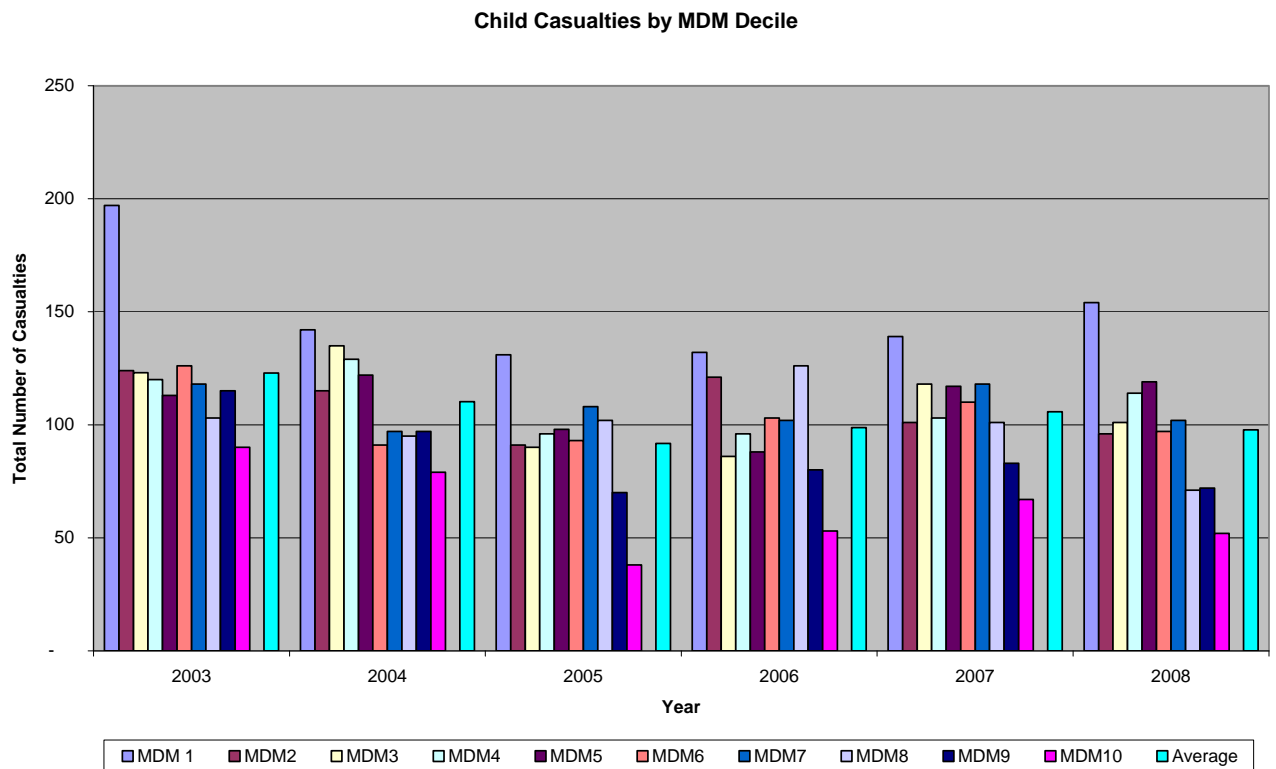
**Table 2.1 Number of Road Casualties 2003 - 2008**

Year	Child	Adult	Total
2003	1229	9096	10325
2004	1102	8405	9507
2005	917	7242	8159
2006	987	8195	9182
2007	1057	8379	9436
2008	978	8573	9551

### 2.2 Child Casualties and Deprivation

2.2.1 The distribution of child casualties is not uniform and a disproportionate number of casualties occur in deprived areas. Figure 2.1 presents child casualties by Multiple Deprivation Measure (MDM) deciles; an average decile figure for each year is also presented. The graph shows that:

- the number of child casualties decreased from 2003 to 2005, then increased to 2007 before dropping back in 2008;
- the number of casualties in decile MDM 1 (the most deprived areas) is a factor of 2 to 3 times the decile MDM 10 (the least deprived areas) number; and
- the number of casualties in decile MDM 1 is substantially greater than the average value.



**Figure 2.1 Child Casualties by Multiple Deprivation Measure Deciles**

**2.3 Cost Valuation of Casualties Prevention**

2.3.1 The Northern Ireland Road Safety Strategy to 2020 has estimated that the value of preventing all road casualties in Northern Ireland over the period 2003 – 2008 would be approximately £500 million each year. Therefore it can be calculated that the value of preventing child casualties over the same period would be approximately £50 million each year.

2.3.2 If the number of child casualties in decile MDM 1 was reduced to the level of decile MDM 2, the value of the casualties prevented would average approximately £2 million per annum.

## 3 Investigate Range of Measures

### 3.1 Aims and Approach

- 3.1.1 The aims and approaches of this workstream were to:
- review the international evidence for evaluated interventions and approaches that aimed to tackle the link between child road casualties and deprivation exploring academic, government and non-government organisation databases and web sites;
  - identify strategic approaches from government departments responsible for road safety in both GB and Ireland and assess the implications for road safety in Northern Ireland; and
  - engage with stakeholders responsible for the delivery of measures, identified in the Road Safety Strategy for Northern Ireland to 2020, to seek views on the relevance of each measure for dealing with deprivation and child road casualties.
- 3.1.2 The main findings are summarised. Full findings are provided in Appendix A, B and C.

### 3.2 Main Findings

#### The evidence on intervention approaches

- 3.2.1 The evidence suggests that there are specific interventions that may be used to tackle the link between child road casualties and deprivation.
- 3.2.2 Education measures that include a 'life course' approach to education, working with parents and teachers to offer progressive, interactive education and training, using the Traffic Club (for 3-4 year olds) and Kerbcraft (practical roadside training for 5-7 year olds) models of delivery are likely to be effective in increasing pedestrian skill. These skills also need to be reinforced by classroom activities and public service advertising for older age groups up to and including pre-driver age. For older children injury minimisation programmes have been effective in changing attitudes and behaviours related to injury prevention generally. Other intervention approaches such as attending interactive Life Skills centres have been shown to provide short term improvement in children's safety knowledge.
- 3.2.3 Environmental change, such as area wide traffic calming; 20 mph zones and safe routes to school supported by engineering measures may have a role to play as long as implementation involves the community. The community also need to be engaged to shed light on where children travel so that access to facilities, services and open spaces can be improved through the provision of crossings.
- 3.2.4 Enforcement is needed to address the risks posed by antisocial behaviour of drivers and riders, especially targeting male drivers and riders aged 17-20 and 31-40 and at times when children play and travel. Targeted enforcement campaigns aimed at detection of unlicensed, untaxed and uninsured drivers and riders may also reduce casualty rates.
- 3.2.5 Multiple risk factors need to be tackled by multi agency approaches ideally involving a dedicated partnership coordinator. The complexity of the relationship between injury risk and deprivation means that practitioners need support to understand these risk factors and how

### 3 Investigate Range of Measures

they can be addressed. The evidence suggests that political support in terms of targets provides a focus for practitioners.

- 3.2.6 Interventions are more likely to be successful in disadvantaged areas if they:
- include comprehensive approaches addressing individual, social and environmental factors which include education, engineering and enforcement;
  - engage and involve the community;
  - are tailored to the unique characteristics of the community;
  - use local data to understand travel patterns and target areas of high risk; and
  - use data to evaluate interventions.
- 3.2.7 Implementation of the above requires skilled practitioners who are trained in evidence-based practice, and who know how to run effective partnerships and engage with the community.

#### Review of Strategic approaches

- 3.2.8 Road safety strategies of GB and Ireland show a commitment to a multifaceted, multi-agency partnership approach to child pedestrian safety involving interventions aimed at children, parents and drivers. The Department for Transport (DfT) has a separate Child Road Safety Strategy (2007) which highlights the link between disadvantage and child pedestrian casualties and targets disadvantaged areas within its action plan, proposing to mainstream evidenced based approaches such as Kerbcraft; children's traffic clubs and 20mph zones in such areas.
- 3.2.9 Both the general road safety strategies (of GB and Ireland) refer to the need to continue to educate children and parents about the need for appropriate child restraint and seat belt use.
- 3.2.10 A review of the above strategies indicates the importance of:
- a programme of education and publicity that is progressive (pre-school through to secondary school), evidence based and evaluated;
  - the delivery of practical pedestrian and cycle training;
  - promotion of personal protection equipment among pedestrians and cyclists such as high visibility clothing and cycle helmets;
  - Road Safety Officers working with schools to provide safe and sustainable travel plans;
  - consideration of child safety in re-development and highway projects;
  - consideration of widespread implementation of lower speed limits supported by traffic calming where children are active;
  - enforcement of speed compliance at times and locations where children are active;
  - enforcement of seat belt wearing among school children;
  - enforcement of parking regulations which might impact on safety at times and locations where children are active; and
  - Road Safety Officers feeling informed about best practice in terms of interventions.

#### NI Road Safety Strategy to 2020

- 3.2.11 A general observation of the stakeholder engagement activity suggests that there was limited understanding of the cost effectiveness of education or engagement interventions and limited awareness of whether the action points in the strategy may be of particular relevance in dealing with deprived communities.
- 3.2.12 However, discussions with stakeholders regarding the actions in the strategy suggests that there are a number of proposed action points that need to be considered in relation to deprived areas.
- 3.2.13 Stakeholders, including Road Safety and Vehicle Regulation Division and PSNI, were concerned that education at primary school level may lack impact and there was a pressing need to evaluate classroom activities and resources to establish effectiveness. It was felt that road safety education needed to be integrated in the secondary school curriculum and that more could be done to engage with youth and community groups. In terms of practical child pedestrian training stakeholders felt that there were some practical difficulties in ensuring that the focus was on schools in socially disadvantaged area. These difficulties related to gaining the support of teachers to carry through training approaches at times where there were too many other competing curriculum demands and staff changes.
- 3.2.14 It was made clear that the Department of Education (DE) has no statutory responsibility for road safety education in schools. However, DE takes a voluntary role in liaising with DOE and its Road Safety Education Officer Service in keeping abreast of developments and where possible seeking synergy with standard school curricula.
- 3.2.15 Stakeholders felt that traffic calming was relatively widespread within socially deprived residential areas. However, stakeholders identified a need to address casualties that occur after school i.e. during recreation hours because of the greater exposure of children to walking and cycling because of low car ownership.

#### 3.3 Consequences of the Findings on Subsequent Elements of the Research

- 3.3.1 This element of the research provided a clear set of measures covering engineering, education, enforcement and evaluation, which was to be further explored and discussed with the community and stakeholders in Workstreams D and E.



## 4 Update Data and Confirm Previous Research Findings

### 4.1 Aims and Approach

4.1.1 This element of research was a wholly technical task concerned with updating the previous research (2010) using the latest Multiple Deprivation Measure 2010 and latest population data. The Workstream consisted of three consecutive tasks:

- receive and review the updated NI Deprivation dataset and the previous research dataset, models and R script analysis files;
- re-run the initial casualty rate analyses; and
- re-run the detailed Level 3 Models.

4.1.2 The main findings are summarised below. Full findings are provided in Appendix D.

### 4.2 Main Findings

4.2.1 The process of updating the population estimates and deprivation data has led to some differences in each set of results produced in this workstream compared to the previous research. However none of the changes have revealed any systematic shifts in the scale or character of the relationship between casualty rates and deprivation.

4.2.2 The casualty rate analyses conducted on the updated data continued to show statistically significant positive correlation between casualty rates and deprivation level. The data shows that a child pedestrian or cyclist is five times more likely to be injured in the most deprived areas of Northern Ireland than in the least deprived areas.

4.2.3 The final detailed Level 3 model developed in the previous research confirmed that each of the factors found to be statistically significant were also significant when fitted to updated data and overall exhibit the same relationships observed previously.

### 4.3 Consequences of the Findings on Subsequent Elements of the Research

4.3.1 This Workstream has shown that the updated data provided a sound basis for developing new models of new 3-year (April 2007-March 2010) and 11-year (January 1999-March 2010) casualty data. These models can be used to explore how the scale and character of the relationships between casualty rates and factors associated with road safety change for these periods.



# 5 Statistical Modelling

## 5.1 Aims and Approach

5.1.1 This element of research was a wholly technical task concerned with analysing the latest datasets in four stages:

- whether the collision location can be used as a proxy for location of residence, using the last 3-year dataset;
- whether or not a relationship also exists between deprivation and the casualty rates for pedestrian / cyclist and car occupant, using a 3-year or 11-year dataset as appropriate;
- identification of relevant variables involved, using statistical modelling techniques; and
- formulation of a statistical best fit model and its application to identify the poorest and best performing Super Output Areas (SOAs).

5.1.2 The main findings are summarised below. Full findings are provided in Appendix E.

## 5.2 Main Findings

5.2.1 There is strong correlation between MDM decile based on collision location and MDM of home. The correlation is particularly strong for pedestrian+cyclist casualties which often occur close to home. The correlation for car passenger is weaker than pedestrian+cyclist reflecting the longer distance nature of these journeys.

5.2.2 The analysis shows that there is a strong and significant relationship between casualty rates (per head of population) of child pedestrian+cyclist and MDM decile at collision site. The relationship between casualty rates of child pedestrian+cyclist and home MDM decile is similar but slightly weaker.

5.2.3 No relationship was found between casualty rates of child car passengers and MDM decile of collision site or home, principally due to the low level of car availability in families living in deprived areas. When the analyses were re-run with the casualty rate calculated on the basis of children within a family with access to a car or van, a statistically significant relationship was identified. However this relationship was weaker and more variable than that for pedestrian + cyclist and the analyses were not continued to consider model formulations.

5.2.4 The exploration of the pedestrian + cyclist relationships has also identified a number of key findings:

- irrespective of the level of deprivation, the rate of pedestrian+cyclist casualties increases the older the age group;
- the rate of male pedestrian + cyclist casualties is higher than the corresponding female rate for all age groups; and
- casualty rates for pedestrians + cyclists in urban areas are significantly higher than those in rural areas.

- 5.2.5 The statistical model was built using the latest 3 year data with collision MDM SOA. Table 5.1 summarises the relevant variables. It is noted that the relationship between the casualty rate and some of the variables is **counter intuitive**, for example, the **less** deprived the living environment of the SOA (which takes account of the quality of housing, and the outdoor physical environment) the greater the casualty rate. However, it must be borne in mind that the relationship represents the contribution of the variable in the presence of all other variables in the model. Where there is correlation between two (similar) explanatory variables in the model, the model will be fitted with one variable dominating the other and the variable being dominated compensates by countering the effect of the other to achieve a balance.
- 5.2.6 The statistical modelling was repeated with the 11 year dataset which produced similar results.
- 5.2.7 As required by the research brief the statistical model has also been used to identify the 30 best performing and 30 worst performing SOA. For the best performing SOA, the number of observed casualties is less than the model's estimated number of casualties. For the worst performing SOA, the observed casualties exceed the model's estimation. These best and worst performing SOA have been identified using both the 3 year and 11 year dataset. The results are significantly different due to the more varied results arising from the smaller number of casualties in the 3 year dataset effectively being spread more widely. The results from the 11 year dataset are quite similar to the results obtained with the 10 year dataset in the previous research.

**Table 5.1 Summary of Statistically Relevant Variables**

Variable	Relationship
MDM Crime	the <b>more</b> crime related to the SOA the greater the casualty rate
MDM Proximity to Services	the <b>less</b> deprived in respect to proximity to services the SOA the greater the casualty rate
MDM Health deprivation and disability	The <b>more</b> health deprivation related to the SOA the greater the casualty rate
the MDM Living Environment	the <b>less</b> deprived the living environment of the SOA the greater the casualty rate
population density	the <b>greater</b> the density of the SOA, the greater the casualty rate
road length of unclassified roads	the <b>longer</b> the length of unclassified roads in the SOA, the greater the casualty rate
traffic proxy (activity)	the <b>more</b> activity there is in the SOA, the greater the casualty rate
number of school places	the <b>more</b> school places in the SOA, the greater the casualty rate
proportion of free school meals	the <b>smaller</b> the proportion of children entitled to free school meal provision in the SOA the greater the casualty rate
sunshine hours	the <b>greater</b> the number of sunshine hours in the SOA, the lower the casualty rate
proportion of people with no qualifications	the <b>larger</b> the proportion of people with no education in the SOA, the greater the casualty rate
number of employed residents	the <b>larger</b> the number of employed residents in the SOA, the greater the casualty rate
the number of junctions per area and km of road	the <b>greater</b> the number of junctions in the SOA, the higher the casualty rate

### 5.3 Consequences of the Findings on Subsequent Elements of the Research

- 5.3.1 No relationship was found between casualty rates of child car passengers and MDM decile of collision site. However a relationship was identified once an allowance was made for the reduced car ownership rates and this relationship may be worthy of further statistical study. It was concluded that at this stage there does not appear to be any merit in developing

models for car occupant casualty rates and no attempt has been made to formulate detailed actions targeted on areas of deprivation to reduce car occupant casualties.

- 5.3.2 Whilst the statistically more robust model has been constructed with the collision MDM (rather than the home MDM) the modelling has identified significant variables related to both societal / demographic and physical / environmental attributes. The following societal variables appear most useful in subsequent research: crime, health, education and employment. The following physical variables appear most useful: proximity to services, length of unclassified roads, traffic and junction density.
- 5.3.3 The modelling used the latest 3 year dataset in order to take account of recent improvements in casualty rate reductions. However the detailed model produces only an approximate fit to casualty rates by individual SOA. (In general terms, at SOA level, the observed number of casualties is small, e.g. less than 5, with many values of zero). This approximate fit suggests that the use of the model outputs to draw conclusions regarding the performance of individual SOAs should be viewed with some caution. This conclusion is unchanged if the larger 11 year dataset is used. Whilst the fit may be improved, the dataset does not take account of measures implemented since 1999.

## 6 Investigate Problems and Issues in Northern Ireland

### 6.1 Aims and Approach

- 6.1.1 This element of the methodology seeks to gain an in-depth understanding of the road safety issues of most concern to children, young people and parents living in deprived areas in Northern Ireland, and the measures which they think may begin to address their concerns. It also seeks the views of local stakeholders working in these communities.
- 6.1.2 Focus groups and individual interviews were undertaken in five areas. These are amongst the most deprived in Northern Ireland; have particularly high child pedestrian casualty rates, and include older inner city and town centre areas, newer out of town urban developments and rural areas.
- 6.1.3 In order to inform the topic guide, analysis of the Road Safety Monitor was provided by DOE in an attempt to identify attitudinal differences to road safety issues (drink driving, speeding or pedestrian safety) between people living in deprived areas of Northern Ireland and people living in the rest of Northern Ireland. (The Monitor included only a small sample size in deprived areas and this may have contributed to the finding that there were no statistically significant differences. Nonetheless there was an indication that people living in deprived areas are slightly more likely to say they drive within the speed limit; perceive exceeding the speed limit by 5mph to be dangerous; are likely to be stopped by the police/caught on a mobile camera for exceeding the speed limit; and consider that the majority of accidents are caused by the inattention of drivers).
- 6.1.4 Site visits were also made to these areas to identify key physical characteristics, and a review of their full combined collision/casualty dataset was undertaken to identify trends regarding causal factors.
- 6.1.5 The main findings are summarised below. Full findings are provided in Appendix F and G.

### 6.2 Main Findings

#### Focus groups and interviews

- 6.2.1 It is clear from the observations of young people that they consider the safety of the roads in relation to the destinations to which they travel to or want to travel to, especially in relation to school, local shops, parks and play areas, youth clubs and on the street where they live. Understanding where children travel to in their neighbourhood is essential to providing appropriate interventions. Local stakeholders also commented that in many areas there are large numbers of young people who want to travel to a range of places but experience difficulties related to commuter traffic, antisocial driving and drug and alcohol use in parks.
- 6.2.2 It is also clear that children and young people are playing out in the streets often because they do not feel there is a safe alternative place for these activities near by, or because there is nothing else for them to do. This is an important consideration for practitioners as most

collisions involving child pedestrians in disadvantaged areas occur during their leisure time i.e. after school, at the weekends and during holiday periods.

- 6.2.3 The findings of this element of the research reveal detailed knowledge about the specific locations and roads which make people feel threatened as road users and what they think can be done to make these roads safer. This information provides road safety practitioners with a resource and an opportunity to provide a targeted response to intervention measures and has given communities a stakeholding in improving their safety.
- 6.2.4 In summary, participants considered the following types of measures would be effective at making the street environment a safer place for them to be:
- **measures to help them cross roads safely** (more/better placed crossings and more crossing patrols);
  - **better enforcement to prevent dangerous driving and parking** (including more speed cameras; more police patrols/greater police visibility, and more/greater penalties and sentences);
  - **changes to the road environment** (including traffic calming; more and better positioned speed, slow down and stop signs; reducing the speed limit; better street lighting; more railings / barriers; more islands; improved road surface; cycle lanes; more/wider footpaths; measures to reduce traffic volumes, and better solutions to parking problems);
  - **education** for children and improved awareness of drivers;
  - provision of **more safe places to play**; and
  - **a multi agency approach.**

### Site visits

- 6.2.5 The site visits were supplemented by analysis of child pedestrian collision and casualty data in the areas. In general terms it was noted that it was common for the collision to occur when the child was crossing the road, generally not at a pedestrian crossing point. There were a number of instances of parked cars contributing or the child not taking care, as well as instances of drunk or drug affected drivers and cars not stopping at pedestrian crossings. Only a small proportion of collisions were related to journeys to or from school.
- 6.2.6 The site visits identified a number of common issues. In urban areas the environment was often a 'busy' environment with through traffic, buses, goods vehicle servicing and pedestrians all evident in a relatively small area. Key features were:
- the heavy volume of traffic on key roads through the area – these were frequently also where the collisions occurred;
  - the provision of pedestrian crossings, generally pelican signal crossings, arranged at intervals along the key roads and coinciding with school routes;
  - frontage activity of shops with parking and servicing;
  - a spread of schools, especially primary schools in the vicinity;
  - some instances of illegal parking close to junctions and obscuring visibility; and

- the widespread use of traffic calming measures (humps) in residential streets.

6.2.7 In the rural area (a village) footways were found to be narrow or not provided at all. There were no pedestrian crossing facilities, whilst the road layout was attractive to young speeding drivers.

### **6.3 Consequences of the findings on subsequent elements of the research**

6.3.1 This element of the research has provided a clear set of measures which local people living in deprived areas and stakeholders working in these communities feel would be most valuable in making their local environment safer. The viability and likely impact of these measures were discussed with a wider range of stakeholders in Workstream E.

6.3.2 The site visits suggested that the road environment in areas of deprivation may be a key contributory factor to the pedestrian casualty rates. A key conclusion was the need to devise measures in order to share priority safely between traffic, parking / servicing and pedestrians.



# 7 Investigate Successful Measures in Northern Ireland

## 7.1 Aims and Approach

- 7.1.1 The aim of this workstream was to further engage the stakeholders responsible for delivering the action measures in the Road Safety Strategy to 2020. The action measures which they were consulted on were those that, on the basis of the findings of earlier Workstreams, held the greatest prospect of reducing road safety casualties for children in deprived areas.
- 7.1.2 Structured discussions were held with the stakeholders as identified from Workstream A, or from guidance received from Road Safety and Vehicle Regulation Division. The focus was spread across the areas of education, engineering, and enforcement.
- 7.1.3 The main findings are summarised below. Full findings are provided in Appendix H.

## 7.2 Main Findings

### Education

- 7.2.1 Education is agreed by stakeholders as being a key measure for reducing collisions and casualties amongst children. Responsibility is shared between the DOE (who provide road safety advice, information and resources, including the Road Safety Education Officer (RSEO) service), and Department of Education (DE) (who provide overall policy and guidance and teaching staff who deliver classroom lessons). There is general agreement that practical child pedestrian safety training is the most effective form of educating children. A practical safety training scheme is currently used to focus resources on areas of deprivation.
- 7.2.2 Publicity campaigns are viewed as effective in raising awareness and independent 'tracking research' is used in formal evaluation. Campaigns can include TV, radio and outdoor poster media, and these range in price. The principal target behaviours are speeding, drink/drug driving and inattention whilst driving. Whilst a new public information campaign focused on the responsibilities of being a pedestrian is being considered it would need to be able to demonstrate cost effectiveness prior to implementation.
- 7.2.3 There is a strong attraction to measures relating to school safety. Parents and children themselves are conscious of the safety risk posed by traffic in the vicinity of schools; they seek the provision of engineering measures without being fully aware of how effective they might be. The 'Safer Routes to School' scheme is being rolled out by the Travelwise team within the Department for Regional Development who have sustainability in addition to safety objectives. There is no focus within the roll-out of the scheme on areas of deprivation.
- 7.2.4 The role of parents seems to be under-developed, perhaps because there are currently no strong institutional channels to reach them and because reaching them may require innovative working practices and non-standard working hours. It is noted that community health professionals may offer the opportunity to engage parents in child road safety.

## 7 Investigate Successful Measures in Northern Ireland

- 7.2.5 It is also noted that initial attempts by DOE to establish a children traffic club in the late 2000s encountered significant difficulties with data protection restrictions on sharing information. There were also concerns that an inability to identify child casualties who had /had not been part of the intervention would hamper robust evaluation.

### Engineering

- 7.2.6 There are well established and comprehensive procedures for selecting a location for engineering measures, especially pedestrian crossing facilities. Whilst the deprivation of an area is not considered, a number of safety-related features are, including routes to school or leisure, traffic and pedestrian volumes, distance to nearest existing crossing and casualty history. Local community input is sought on the provision of new crossings. It is not entirely clear whether 'slight' casualties are considered in the process as their recording is viewed as inconsistent and unreliable.
- 7.2.7 Roads Service has recently developed guidance regarding the setting of local speed limits. This represents a more flexible approach and an increased willingness to accommodate 20 mph zones which will include traffic calming measures, and 20 mph limits which need not include traffic calming measures. It is notable that Roads Service will seek to embrace the concept of mixed priority routes, and encourages the introduction of 20 mph zones or limits where pedestrian and cyclist movements are high. However the guidance expressly states that major through routes would be excluded from 20mph zones or limits.
- 7.2.8 Roads Service has a clear understanding of the costs of engineering measures and procedures to prioritise their implementation. Roads Service evaluates the effectiveness of their safety schemes in the annual Road Safety Engineering Report on the effectiveness of measures employed.

### Enforcement

- 7.2.9 Any increase in parking enforcement in deprived urban areas would need to involve community consultation. Whilst the primary aim of any increased enforcement would be to reduce illegal parking which poses a safety risk, i.e. parking near junctions or crossings or on pavements, the measure could be viewed locally as punitive and simply revenue raising. In addition, any change in parking enforcement would need substantial lead time to arrange with the on-street enforcement operating company. In addition, where residential areas are close to urban centres, any additional management or enforcement of parking controls may require the introduction of residential parking schemes. Such a scheme would require additional consultation and agreement.

### Evaluation

- 7.2.10 Roads Service assess research undertaken by the DfT in GB on the effectiveness of individual engineering measures, and supplement this with their own before and after effectiveness monitoring. However, whilst there are other exceptions, in general there is only limited monitoring and evaluation completed regarding the efficiency or effectiveness of individual measures. In many cases the evaluation is related to the effectiveness of delivery rather than the final outcome of reduced casualties. Whilst it must be stressed that in practice it is often impossible to link the completion of individual measures with changes in the number of collisions or casualties, it is clear that, in general, additional evaluation will be worthwhile and required.

**7.3 Consequences of the Findings on Subsequent Elements of the Research**

- 7.3.1 It is important that the measures which target child road safety in deprived areas are cost effective. Many of the factors contributing to the higher casualty rates in deprived areas are common with non-deprived areas; the difference is that the factors occur more frequently or more intensively or in combination.
- 7.3.2 Some of the measures likely to be recommended therefore are based upon proven Action Measures presented in the Road Safety Strategy but with added resources and focus in deprived areas. Other measures to be recommended will be new measures which will take time to agree across the implementing authorities. All recommended measures will include integrated evaluations.



## 8 Recommended Programme of Measures

### 8.1 Introduction

8.1.1 This chapter provides our recommended prioritised five year programme of measures to reduce road collisions and casualties involving children in deprived areas of Northern Ireland. The programme has been drawn together taking account of the earlier workstreams of the research which confirms one or more of the following:

- the importance of the target group in deprived areas;
- the over representation of the problem behaviour or physical environment attribute in deprived areas; and
- the effectiveness of the measure as proven from existing practice.

8.1.2 Table 8.1 summarises the recommended programme of measures and includes education, engineering, enforcement and empowerment measures. The measures are explained in more detail under each of these areas separately in the remainder of the Chapter. Whilst there is a focus on child pedestrian safety, opportunities to provide additional assistance relating to car passenger and cyclist safety are also identified.

#### Notes relating to Table 8.1

8.1.3 Evaluation needs to be an integral part of each of the measures and should be built in at the outset. This is the case in particular for ENG 2 as explained in detail below.

8.1.4 It is recommended that the measures are adopted in a progressive manner depending on the level of resources available. The measures have been classified by timescale and resources as follows:

- **Timescale – year of first implementation.** Year 1 measures could be implemented in year 1, i.e. immediately. These measures require no or low levels of resource and can be delivered by existing organisations with limited consultation. Year 2 measures will require medium or high level of resource and so may involve budgeting delays. They may also involve significant changes in working practices which too require significant time to establish and agree.
- **Resources – low, medium or high.** These are generally the consultants' own estimates. Low levels of resources are allocated to measures that could be delivered by the existing organisations with assumed relatively minor reallocation of priorities. Medium resources are estimated to apply when significant new resources will be required, perhaps in terms of additional staff resources or alternatively consultancy or capital expenditure. High resources signify substantial additional personnel or capital spends.

Table 8.1 Summary of Recommended Measures

Code	Summary Description of Action Measure	Year	Resources	Lead Agency	Other Agencies
<b>Education</b>					
ED 1A	Continued provision of road safety education in schools	1	0	DOE	DE
ED 1B	Operate enhanced school-based education programme with additional teaching time allocated to classroom teaching in primary schools in 10% MDM	2	M	DE	DOE
ED 2	Provision of materials and short teaching plans linked to current Publicity Campaigns	1	L	DOE	DE
ED 3A	Continue practical pedestrian training for years 3 – 5 in primary schools in 10% MDM	1	L	DOE	DE
ED 3B	Raise awareness in parents of children in years 3 – 5 involved in practical pedestrian training	1	L	DOE	DE
ED 3C	Extend practical pedestrian training to schools in bottom 20% MDM	2	M	DOE	DE
ED 3D	Enhance practical pedestrian training to Kerbcraft levels in primary schools in bottom 10% MDM and include parents	2	H	DOE	DE
ED 4	Deliver child safety training for parents of pre-school children through SureStart or other family help agencies	3	M	DHSS PS	DOE
<b>Engineering</b>					
ENG 1	Undertake review of statistics and site conditions in 10% MDM with 10% highest collisions / casualties	1	M	RS	DOE
ENG 2	Implement pedestrian measures arising from ENG 1 and review of assessment procedures	2	M	RS	

Code	Summary Description of Action Measure	Year	Resource	Lead Agency	Other Agencies
<b>Enforcement</b>					
ENF 1	Operate additional police patrols in areas arising from ENG 1	2	M	PSNI	
<b>Empowerment</b>					
EMP 1	Undertake pilot comprehensive community-based road safety scheme in 3 areas arising from ENG 1	2	H	RS	RSVRD DSD, PSNI

## 8.2 Education

- 8.2.1 Whilst it is not possible to confirm the precise cause of the collisions independently, the collision / casualty dataset includes a large proportion of child pedestrian casualties coded with contributory causes related to crossing the road, parked cars and to lack of attention. Education-based measures can emphasise that children need help to cope with hazardous environments and thus improve their own safety. Providing additional education-based measures in schools in areas of deprivation should ensure that the resources are closely targeted. The dataset also identified a high casualty rate for pre-school children in deprived areas; these children are dependent on their parents for their safety.
- 8.2.2 **ED1A – The continued provision of road safety education in schools** is highlighted as it is understood that the RSEOS is currently under review. This research has identified a number of issues regarding the effectiveness and limited evaluation of the programme delivered by the Service. Nonetheless, this research confirms the continuation of the Service or similar to provide a base-line level of school-based road safety education.
- 8.2.3 **ED1B – Assisted classroom-based teaching of road safety education.** Concerns were expressed regarding the quantity and quality of road safety education delivered by classroom teachers. In the short-term it is understood that the DE will complete its survey of road safety education provided in schools across Northern Ireland into this issue. In any event, it is recommended that additional class-room teaching time is targeted on schools in the most deprived 10% areas to provide help directly where it is needed most. The latest figures confirm there are 1599 schools and pre-school education centres in Northern Ireland. It is estimated that approximately 160 schools and pre-school centres (10%) would be provided with additional assistance. It is envisaged that this additional teaching time would be administered by DE with assistance from DOE RSEOS as required. It is proposed that some of the conclusions drawn from this research are incorporated into additional classroom teaching. Additional focus should be placed on:
- crossing the road, dealing with the realities of having to cross between parked cars;
  - paying attention when walking or playing close to the road and when using pedestrian crossings;

- wearing seatbelts in the car – even when making short trips and sitting in the rear, and encouraging everyone in the car to wear their seatbelt; and
- the need for attention to safety when cycling.

- 8.2.4 **ED2 – Supplementary Publicity Campaign materials.** The focus group research identified that the TV campaigns were especially memorable to children, even though not all campaigns were age-appropriate. However, as a simple cost-effective measure it is proposed that hard-copy materials linked to TV campaigns and short teaching plans are made available to RSEOs and to schools in deprived areas to reinforce the campaign messages and link to school-based road safety education. Campaigns concerned with crossing the road and seatbelt wearing are particularly appropriate. Whilst Road Safety and Vehicle Regulation Division in DOE would provide the materials, classroom teachers would deliver the message.
- 8.2.5 ED3 measures are concerned with the implementation of practical pedestrian training in a range of different ways. Practical training was confirmed by many strands of the research as a primary measure in assisting children's safety.
- 8.2.6 **ED3A – Continuation of the current Practical Child Pedestrian Safety Training Scheme (PCPST)** has been included as a baseline measure in view of the current review of the RSEO Service. PCPST is already targeted in deprived areas, through the free school meals criterion. It is proposed that the criterion is amended to apply more directly to schools located within or with a predominant catchment within the 10% most deprived areas (SOAs).
- 8.2.7 **ED3B – Raise awareness in parents of children in years 3 – 5 receiving PCPST** is proposed to boost the effectiveness of PCPST at low cost to the schools or DOE. The PCPST is the most personalised product of the current RSEO Service and provides opportunity to engage parents in a practical manner. If successful, it could be expected that parents would spread the road safety message and informal crossing training within their own families and perhaps communities. These parents may in effect become local 'champions' for road safety.
- 8.2.8 **ED3C – Extend the reach of PCPST to 20% most deprived schools.** This would involve doubling the resources allocated to PCPST and clearly would not contribute to the DOE Road Safety indicator of reducing child casualties in the most deprived 10%. However, the research has noted that high child casualty rates are not limited to the 10% most deprived areas and if the PCPST is effective it would be counter-intuitive to restrict its application.
- 8.2.9 **ED3D – Enhance PCPST in line with the 'Kerbcraft' scheme** as operated in England, Scotland and Wales and to include parents in its delivery. This is considered to involve a medium level of resources and would be lead by the DOE RSEOs. The Department for Transport's (DfT) evaluation of this scheme found far reaching benefits within the community.
- 8.2.10 **ED4 – Introduce child safety training for parents of pre-school children.** It is proposed, where possible, to deliver training in areas of deprivation through existing organisations. The SureStart Children's Centre programme may offer one such opportunity. This can emphasise the importance of child safety seats and seatbelt use and of appropriate supervision of young children and the need for safe play areas. Whilst the Department for

Health Social services and Public Safety may be the lead partner, the training may be supplied by the RSEO.

- 8.2.11 The ED3 and ED4 measures are presented as a progressive programme of interventions. It is suggested that ED3A and ED3B represent a high value return programme for year 1. For Year 2 a more difficult decision may be required on implementing either ED3C or ED3D with progression to ED4 in year 3.

### 8.3 Engineering

- 8.3.1 The analyses of the child pedestrian collision / casualty datasets undertaken in Workstream D provided important trend information on collision causes. Plots of the collision locations and site visits provided complementary information. It is suggested that a programme of similar safety reviews may provide key information which would justify targeted improvement measures.
- 8.3.2 A high proportion of child casualties arise from the act of crossing the road. Pedestrian crossing facilities are a proven effective road safety measure but there are other engineering interventions such as speed reduction measures or widening footways which could also contribute. In general Roads Service has many more requests for pedestrian crossings or other safety measures than can be provided. Roads Service uses a prescribed assessment process to prioritise safety engineering measures.
- 8.3.3 **ENG1 – Review of statistics and site conditions.** It would not be practical or cost effective to undertake a safety review of the 10% most deprived areas. However, by focusing the review on SOAs within the 10% most deprived **and** containing the 10% highest child pedestrian collision / casualty rates it is expected that a manageable-sized workload can be found. The review should include a map-based plot of the collision location and casualty severity and an initial assessment of contributory causes. It is proposed that 'slight' personal injury casualties should be considered in addition to serious injury and fatalities; it is suggested that this will provide a greater spread of collisions and a more representative view of the risks encountered in areas of deprivation. Where location groupings and common cause patterns emerge engineering measures may be appropriate. It is noted that such reviews, without follow-through actions, will not provide casualty reductions. Therefore it is proposed that the measure should be trialled on a relatively small scale to test its practicality. The measure would be lead by Roads Service staff with Road Safety and Vehicle Regulation Division and DOE Analytical Services Branch providing perhaps statistical assistance and could be implemented in year 1.
- 8.3.4 **ENG2 – Implementation of pedestrian crossings.** The provision of additional pedestrian crossing facilities in deprived areas may contribute to reduced child pedestrian casualties. It is proposed that particular priority is given to areas of deprivation in the assessment for provision of pedestrian crossing facilities. This priority should not outweigh other practical considerations but be an additional consideration in the scoring frame. The consideration of deprivation may take account of the unseen potential demand for pedestrian crossings due to low car ownership and use of community-based leisure facilities Special consideration should be given to low-cost informal provision such as kerb build-outs and central pedestrian reservations at more frequent intervals in addition to more formal zebra or signal controlled crossings. The reviews undertaken in ENG1 may also provide the justification for additional

pedestrian crossings. The lead agency would be Roads Service. It is expected that the measure could not be implemented immediately as it would require a change in Roads Service procedures and/or the substantial completion of ENG 1.

### 8.4 Enforcement

- 8.4.1 Analysis of the collision / casualty records, fitting of the statistical model and stakeholder discussions have all confirmed illegal driving and parking practices as contributing to child casualties in deprived areas. The targeted practices are drink/drug driving, speeding, lack of attention and disobeying traffic signals including pedestrian crossings. Illegal parking close to junctions and hence contributing to pedestrian crossing dangers was also identified; this form of illegal parking is enforced by PSNI officers.
- 8.4.2 **ENF1 – Operate additional police patrols in areas of deprivation.** This measure is proposed to complement the PSNI National Intelligence Model of operation and follow confirmation of problem areas and solution measures arising from measure ENG1. It will be important that it is viewed positively by the local community and not as a punitive measure. Where possible, patrols should be well integrated with local community opinions and be seen to be targeting unsafe illegal behaviour which would impact directly on child safety. Patrols should therefore occur during hours when children will be active – e.g. after school but before 9pm, say. Patrols on foot or bicycle may be more appropriate than cars to ensure neighbourhood visibility and integration.

### 8.5 Empowerment

- 8.5.1 The detailed statistical model identified traffic activity, junction density and access to services as being linked to child pedestrian casualties. In addition the literature review and focus groups identified multi-faceted and community-based approaches as representing the measures most likely to succeed in lowering child road casualty rates in deprived areas.
- 8.5.2 It is also acknowledged that Roads Service has had substantial success in the past ten years in implementing traffic calming schemes that have contributed to considerably reduced pedestrian casualties in residential areas. However the reduction in casualties has not been as marked beyond 2005 and there is a view that many of the more obvious, high value and low cost calming schemes are now in place.
- 8.5.3 In Britain the challenges faced by Mixed Priority Routes in providing for local pedestrian and servicing access and through radial traffic movements have recently been identified and potential solution frameworks are beginning to emerge<sup>2</sup>. The latest thinking along these lines is presented in the Manual for Streets 2<sup>3</sup> (MfS2) which offers an alternative highway engineering template to the Design Manual for Roads and Bridges which was developed primarily for the trunk road network. The problems identified in the central Belfast focus group areas bear striking similarities with some of the Case Studies in the MfS2. In addition to the need for more flexible application of existing highway and traffic design standards

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<sup>2</sup> Department for Transport - Mixed Priority Routes: Practitioners' Guide (2008) available at <http://www.dft.gov.uk/pgr/roadsafety/dpp/mpr/>

<sup>3</sup> Chartered Institute of Highways and Transportation – Manual for Streets 2 (2010) available at <http://www.ciht.org.uk/en/publications/technical-guidelines.cfm/manual-for-streets-2--wider-application-of-the-principles-2010>

MfS2 advocates the use of community involvement in the design process. This approach has also been used in the Link and Place<sup>4</sup> approach applied successfully in London and elsewhere.

- 8.5.4 **EMP1 – pilot comprehensive community-based road safety schemes.** It is proposed that pilots are run in three areas identified in ENG1 as being particularly suitable for a mixed priority approach. If practical, the areas should include a rural area in addition to urban areas. The lead agency would be Roads Service but if possible it may be run in conjunction with a regeneration or urban renewal project with funding from Department for Social Development and/or a local council in addition to Road Safety and Vehicle Regulation Division and PSNI.
- 8.5.5 As an example, the measures might include a comprehensive re-working of the roadscape on the radial road and the provision of improved leisure facilities for children as an alternative to the street. The design team would probably involve consultants with experience of MfS2, urban design and community involvement and make full use of detailed collision datasets and Quality Audit and Safety Audit processes. A spin-off of the pilots would be a skills transfer to NI-based technical staff in the agencies.

### 8.6 Evaluation

- 8.6.1 All of the proposed measures would include monitoring and evaluation processes to ensure that success indicators, effectiveness and value for money are assessed on an ongoing basis. For the larger pilot measures, it may be worthwhile to establish control samples and collate before and after data regularly from PSNI records (including severity of casualties) in addition to monitoring intermediate outputs such as constituent measures delivered. However, for the less resource intensive measures it may be adequate to make use of standard collision / casualty data collated by Roads Service.
- 8.6.2 For all measures proposed it will be worthwhile to undertake an appraisal at a proportionate level of detail. This should identify the cost of the measure and estimate the possible impact in casualty reduction expected or at least the change in the behaviours related to casualty reduction. This casualty reduction can be translated into a monetary cost saving using standard DfT values as undertaken in the Road Safety Strategy to 2020.

### 8.7 Reserve List

- 8.7.1 The following measures were considered closely and are held in the reserve list:
- **Road Safety Bus.** This mobile resource centre was favoured for its impact by a number of RSEOs and has been adopted by the Road Safety Authority in the South of Ireland. It has been excluded principally on the basis of capital cost and lack of personalised messages.
  - **School Crossing patrols.** This measure could provide individually targeted assistance to reduce child pedestrian casualties in deprived areas. It has been excluded principally as it would generally only apply at school starting and finishing

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<sup>4</sup> Jones - Link and Place: A Guide to Street Planning and Design (2008)

times whereas the key time for child pedestrian casualties is later in the day after 6pm, approximately.

- **Pedestrian campaign.** This measure is currently being considered by Road Safety and Vehicle Regulation Division. It has been excluded principally because it would be difficult or not cost effective to run this specifically targeted in areas of deprivation.
- **Increased Parking Enforcement.** This measure could reduce illegal parking which contributes to safety risks in deprived areas. It has been excluded principally because the increased police patrols (ENF1) which have responsibility for enforcement of illegal parking within 15 metres of junctions, may have the desired effect.

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