



GIG
CYMRU
NHS
WALES

Iechyd Cyhoeddus
Cymru
Public Health
Wales

CHILD DEATH REVIEW PROGRAMME

Thematic review of deaths of teenagers

aged 13 to 17 years in motor vehicles
between 2006-2010



Authors

Dr Sarah J Jones, Consultant in Environmental Health Protection

Beverley Heatman, Programme Manager, Child Death Review Programme

Dr Ciarán Humphreys, Consultant in Public Health/Health Intelligence

Panel facilitators

Dr Sarah J Jones, Consultant in Environmental Health Protection, Public Health Wales

Beverley Heatman, Programme Manager, Child Death Review Programme, Public Health Wales

Gillian Hopkins, Administrative & Resource Officer/Information Officer, Child Death Review Programme, Public Health Wales

Expert panel membership

Rhiannon Beaumont-Wood, Director of Nursing, Public Health Wales (also represented Welsh Ambulance Service Trust)

Dr Nicola Christie, Director, Centre for Transport Studies, University College London

Matthew DeSchoolmeester, Police Constable, Serious Collision Investigation Unit, South Wales Police

Carwyn Evans, Inspector, Roads Policing Unit, South Wales Police

Michelle Harrington, Road Safety Manager, Royal Society for the Prevention of Accidents (RoSPA)

Dr Ciarán Humphreys, Consultant in Public Health/Health Intelligence, Public Health Wales

Karen McFarlane, Development Officer, Child Safety, Children in Wales

Dr Lorna Price, Designated Doctor, Safeguarding Children Service, Public Health Wales

Wayne Tucker, Road Safety Manager, Roads Policing Unit, South Wales Police

© 2013 Public Health Wales NHS Trust

Material contained in this document may be reproduced without prior permission provided it is done so accurately and is not used in a misleading context.

Acknowledgement to Public Health Wales NHS Trust to be stated. Copyright in the typographical arrangement, design and layout belongs to Public Health Wales NHS Trust.



Contents

1	Background	2	4	Limitations	9
2	Methods	3	4.1	Data quality and hierarchy	9
2.1	Case definition	3	5	Conclusions	11
2.2	Data sources	3	6	Key Messages	12
2.3	Literature review	3	6.1	Partnership working	12
2.4	Expert panel	3	6.1.1	Procedural Response to Unexpected Death in Childhood	12
2.5	Policy context	4	6.2	Interventions	12
3	Findings	5	6.2.1	Graduated Driver Licensing	12
3.1	Physical environment factors	6	6.2.2	Telematics (Black Box Technology)	12
3.1.1	Time	6	6.2.3	Pass Plus Cymru	13
3.1.2	Day of week	6	6.2.4	Enforcement	13
3.1.3	Road type	7	6.3	Accountability and reviewing	13
3.1.4	Speed	7	6.4	Welsh Ambulance Service Trust	13
3.1.5	Weather conditions	7	6.5	Public awareness	13
3.2	Human factors	7	6.6	Other	13
3.2.1	Number of casualties in vehicle	7	7	Recommendations	14
3.2.2	Seat belt use	7	7.1	Partnership working	14
3.2.3	Driver licensing and driver age	8	7.2	Interventions	14
3.2.4	Mobile phone use	8	7.3	Reviewing of deaths involving motor vehicles	14
3.2.5	Substance abuse	8	7.4	Procedural Response to Unexpected Death in Childhood	14
3.3	Vehicle factors	8	7.5	Enforcement	14
3.3.1	Engine size	8	7.6	Welsh Ambulance Service Trust	14
3.3.2	Vehicle defects	8	7.7	Public awareness	15
3.4	Social Factors	8	7.8	Research	15
3.4.1	Journey purpose	8	7.9	Information sharing	15
3.4.2	Criminal record	8	7.10	Pass Plus Cymru	15
3.4.3	Safeguarding	8		References	15



1 Background

In the pilot phase of the National Child Death Review (CDR) programme, the need for a review of deaths of children and young people in motor vehicles was identified.

The CDR Programme is being re-established in Wales. The aim of the programme is to identify and describe patterns and causes of child death, including any trends, and to recommend actions to reduce the risk of avoidable contributory factors. One of the objectives of the programme is to undertake thematic reviews and make recommendations. This is the first thematic review of the re-established CDR Programme (Public Health Wales 2013a).

Motor vehicle collisions resulting in the death of teenage occupants is a major preventable cause of death among children in Wales. The CDR Programme Annual Report (Public Health Wales 2013b) highlights 375 deaths of external cause among children and young people (age 0-17) registered between 2002 and 2011. Thirty per cent of these (113) were due to road traffic accidents among those (ages 12-17); 56% (63) of which occur as vehicle occupants.



Methods

2.1 Case definition

Cases for this review were defined as deaths of teenagers aged 13 to 17 years, who were drivers or passengers in motor vehicles, occurring between 1 January 2006 and 31 December 2010.

2.2 Data sources

Data were collected from a number of sources to ensure completeness. These sources were:

- Child Death Review Database
- Office for National Statistics mortality data
- STATS19 police crash records
- The Welsh Government mortality data
- Police accident investigation reports
- External, unofficial, sources including
 - Royal Society for the Prevention of Accidents (RoSPA)
 - Media and internet reports

Reconciliation of data sources, data quality and hierarchy are discussed in section 4.

2.3 Literature review

A high level review of the literature was undertaken by Public Health Wales for the Thematic Review Expert Panel, following a prototype process for CDR Evidence Reviews.

The objective of the review was to identify measures or interventions that have potential for preventing motor vehicle deaths in teenagers. It consisted of a contextual and scoping review followed by an effectiveness review.

The effectiveness review had the following questions:

- Primary review question:
How effective are measures or interventions in preventing motor vehicle deaths in teenagers?
- Secondary question: What aspects of interventions produce heterogeneity in results and how might this impact upon implementation in Wales?

Full details of the method, together with the findings, are included in the literature review report.

2.4 Expert panel

An expert panel was convened. Members were drawn from academia, nursing, safeguarding, public health, police force, ambulance service and from the third sector, Children in Wales and RoSPA (see inside front cover for further details).

Three meetings were held. Meeting one on 26 February 2013 saw the presentation mainly of STATS19 data, with accompanying discussion around the additional data needed to support further understanding of the circumstances of these deaths. Meeting two (9 April, 2013) presented additional information and started to develop conclusions and recommendations. At meeting three, on 23 April 2013 the panel considered the high level evidence statements of the literature review and developed draft conclusions and recommendations.

The Child Death Review Steering Group provided comments on the draft conclusions and recommendations with a view to ensuring they were clear and can lead to action. The expert panel agreed the final version of the report.

2.5 Policy context

The Welsh Government's consultation (ended December 2012) on its approach to road safety until 2020, which includes specific targets for young people – one of the most vulnerable road user groups. In its consultation document, the Draft Road Safety

Delivery Plan, the target for casualty reduction is:

'A 40% reduction in the number of young people (aged 16-24) killed and seriously injured on Welsh roads by 2020, meaning 139 fewer young people killed and seriously injured casualties (and 51 fewer than 2011)' (Welsh Government 2012, page 4).

The Welsh Government Programme for Government includes a commitment to "target high-risk road users (motorcyclists, young drivers and vulnerable road users) through a combination of measures including education, engineering and enforcement" (Welsh Government, 2012).

There are a number of road safety and traffic management groups and consortia that sit locally, regionally and nationally in Wales. In recent years, the Welsh Government has aimed to streamline the number of groups, to reduce the burden of attendance, and ensure that they feed a single national group that oversees road safety delivery; the Wales Road Safety Monitoring and Evaluation Group. This is soon to be renamed the Wales Road Safety Strategic Group.



3 Findings

The panel were presented with data on 28 crashes, where 90 people were injured, 45 of them fatally (figure 1). All of the fatalities were in cars. Thirty four of the fatalities were aged 13 to 17 years (teens)¹.

Seventeen of 25 teen passenger fatalities were being driven by a 17 to 19 year old, seven of 25 were being driven by someone aged 20 or over.

This review focussed on these cases of deaths of children and young people. Nonetheless, each crash was considered individually; in some cases these

included other vehicles without the death of a child or young person, other casualties and/or deaths among adults.

Following the first panel meeting, additional information was sought from the police and ambulance service. In the time available it was not possible to obtain information from all four Welsh police forces. Therefore, the findings include the total number of crashes on which the specific finding is based.

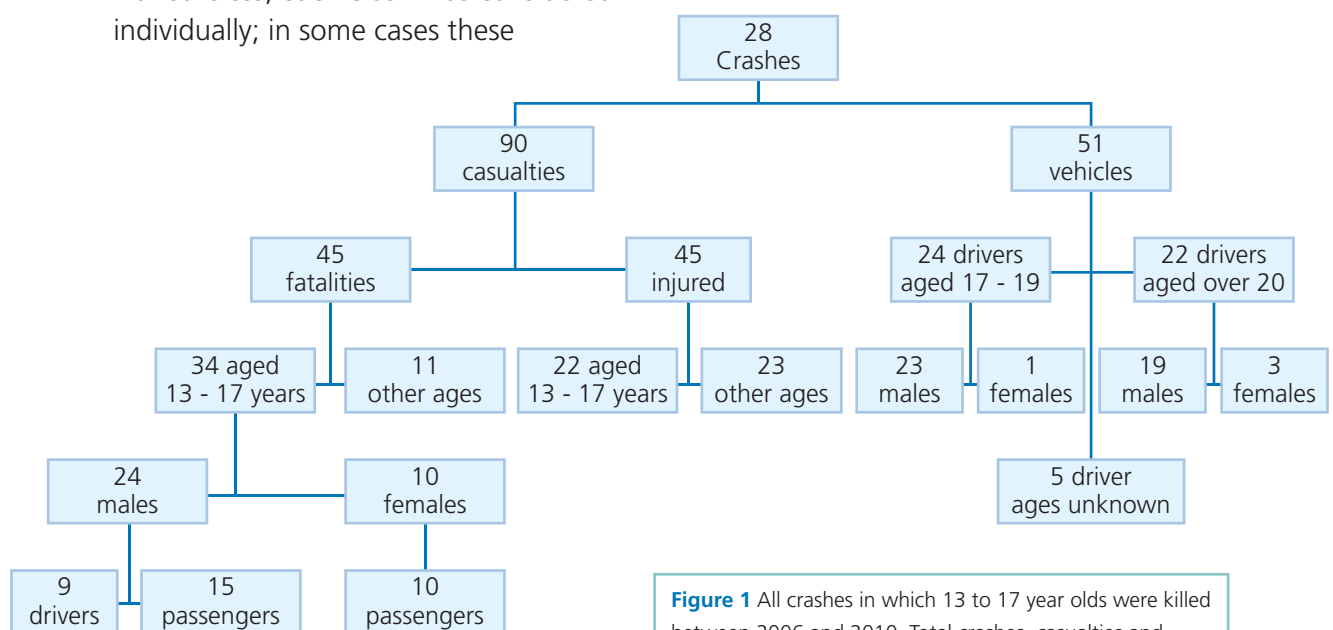


Figure 1 All crashes in which 13 to 17 year olds were killed between 2006 and 2010. Total crashes, casualties and fatalities by age and sex. Total vehicles by driver age and sex. Source: STATS19

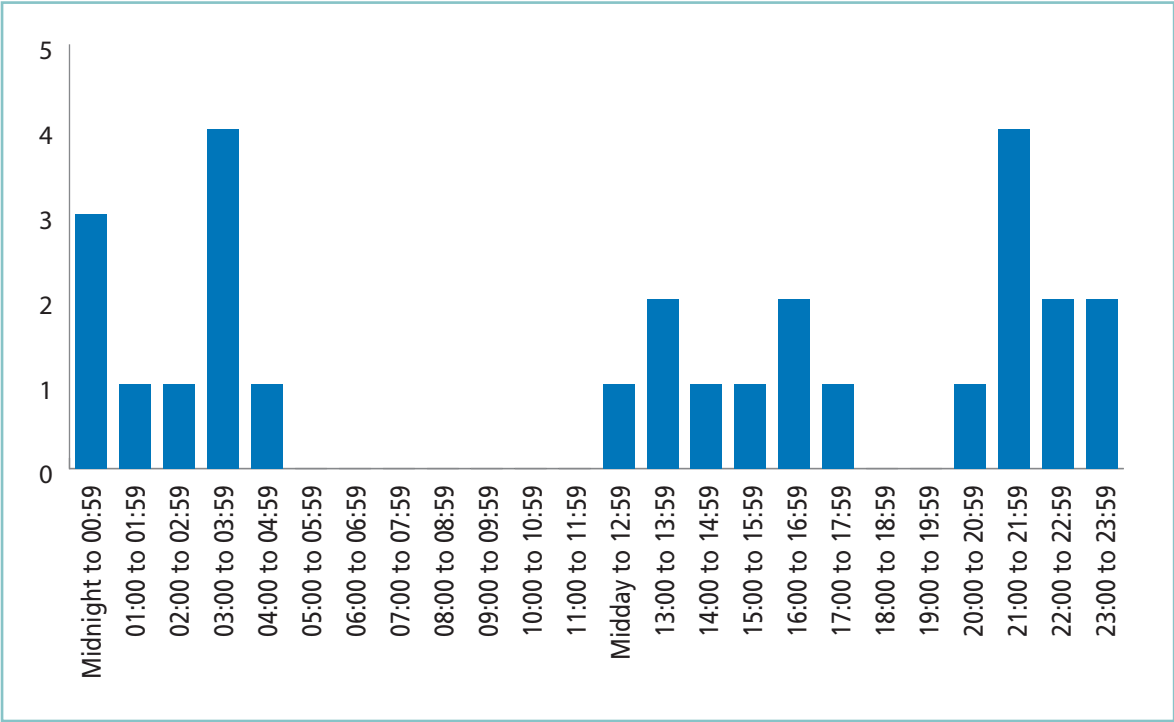
¹ Thirty two of these fatalities were recorded by STATS19 as being aged between 13 and 17. Data available to the CDR, including dates of birth, showed that two casualties were recorded as being 18 by STATS19, but were actually 17. Therefore 34 teen fatalities have been included in these analyses.

3.1 Physical environment factors

3.1.1 Time

Nineteen of 28 crashes happened between 21:00 and 05:00 (Figure 2).

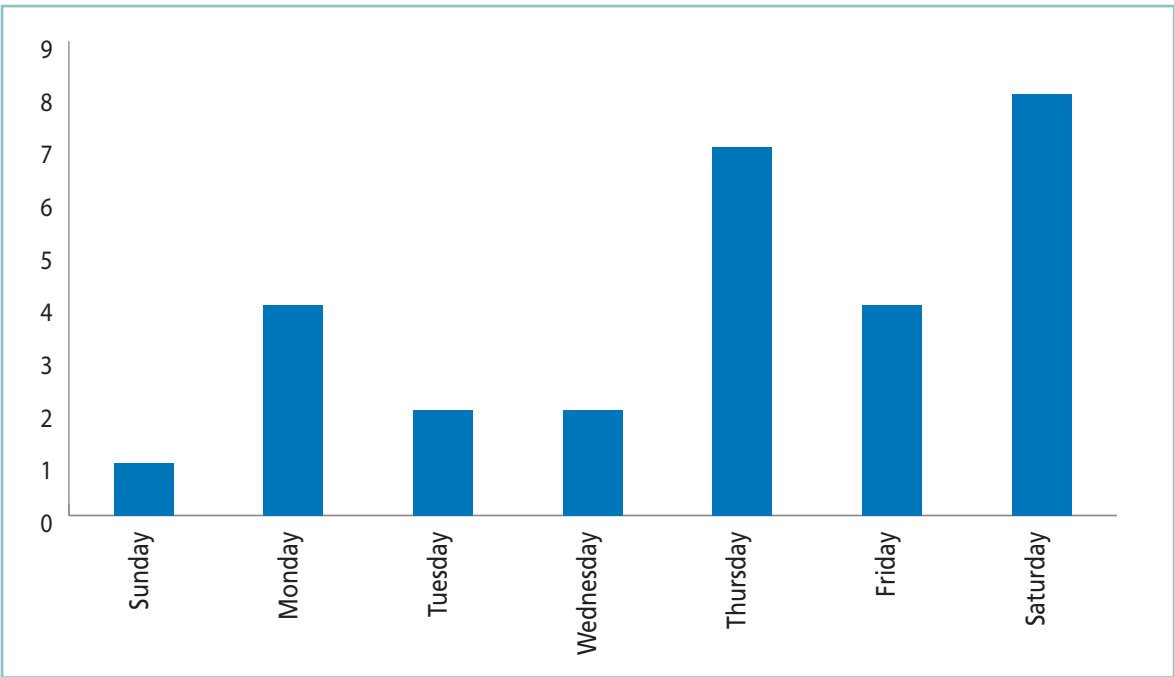
Figure 2 Distribution of crashes by hour of occurrence. Source: STATS19



3.1.2 Day of week

Nineteen of 28 crashes happened on a Thursday, Friday or Saturday.

Figure 3 Distribution of crashes by day of week. Source: STATS19



3.1.3 Road type

Just one of 28 crashes occurred on a motorway, with 17 of 28 on A-roads. Twenty-three of 28 were on single carriageway roads.

3.1.4 Speed

Eleven of 28 crashes occurred on 60mph roads, nine of 28 on 30mph roads. In nine of 14 crashes, police crash investigations suggested that vehicles were travelling faster than the speed limit.

3.1.5 Weather conditions

Nineteen of 28 crashes happened in fine weather, but the road was dry only in 14 of 28, wet or damp in 11 of 28. Of the remaining three crashes one occurred on a frosty / icy road, one on a flooded road, with no information available for the final crash.

3.2 Human factors

3.2.1 Number of casualties in vehicle

Thirteen of the 34 teen fatalities were travelling in vehicles with five or more casualties (Table 1). These accounted for 22 of the total of 45 fatalities.

Table 1 Fatalities by number of casualties in vehicle²

Number of casualties in vehicle ²	Number of vehicles	Teen fatalities	Other fatalities	Total fatalities
1	3	3	0	3
2	9	9	0	9
3	5	6	2	8
4	3	3	0	3
5	6	8	4	12
6	2	5	5	10
Total	28	34	11	45

3.2.2 Seat belt use

Data on seat belt use were incomplete; but, 16 of the teen passenger fatalities were not wearing seat belts (Table 2) and four were known to be wearing seat belts. Eleven of the fatalities who were not wearing a seat belt were rear seat passengers.

Table 2 Seat belt use by teen fatalities by sex and occupant type

	Seat belts	Male	Female	Total
Driver	Yes	3	0	3
	No	0	0	0
	Not known	5	0	5
Front seat passengers	Yes	2	1	3
	No	3	2	5
	Not known	2	1	3
Rear seat passengers	Yes	1	0	1
	No	6	5	11
	Not known	1	1	2
Not known	Not known	1	0	1

² These data are based on STATS19 counts of casualties, rather than actual occupants. Therefore it is possible that there were more non-casualty occupants than is shown here.

3.2.3 Driver licensing and driver age

Driver licensing status was only available for 18 drivers (Table 3). All held full licences and 14 were aged between 17 and 19 years. In total, 24 drivers of vehicles involved in crashes in which there were teen fatalities were aged 17 to 19 years. Of the 17 to 19 year old drivers, three had held their full licence for under one year, five had held it for one year and one had held it for 18 months, information was not available for the rest.

Table 3 Licensing of drivers of vehicles in which teen fatalities occurred

	17 to 19 years driver	Older driver	Not known	Total
Full	14	4	0	18
Not known	10	5	1	16

3.2.4 Mobile phone use

Limited data were available but from the information obtained it was identified that 13 were not using mobile phones. However, there should be no inference made that the remainder were using mobile phones. In 10 cases, passengers were confirmed as not using mobile phones; however no further information is available.

3.2.5 Substance abuse

Five of 16 drivers were confirmed to be over the legal drink drive limit. One of these drivers also tested positive for illegal substances. One further driver tested positive only for illegal substances.

3.3 Vehicle factors

3.3.1 Engine size

Data were obtained on engine size for 14 vehicles in which fatalities occurred; seven had an engine size of 1200 or less; just one had an engine size of greater than 2000.

3.3.2 Vehicle defects

Just three of 22 vehicles were identified as having defects; one had illegal tyres, one had defective tyres and brakes; one was described as having defects but what these were was not specified.

3.4 Social Factors

3.4.1 Journey purpose

Fourteen of 22 drivers were on 'other' journeys; they were not travelling to or from work or school.

3.4.2 Criminal record

Six of 16 drivers were known to the police and had criminal records; four of these were aged 17 to 19 years.

One of the vehicles had been stolen.

3.4.3 Safeguarding

There were no identified safeguarding concerns in 13 of the 22 crashes for which information was available; information was not available in the remaining cases. There was no record of any occupants of the cars involving a teen fatality being on the child protection register where data was available (15 crashes).



4 Limitations

All of the data sets used in this review have limitations. In addition, there were some conflicts between data held in different sources, for example, age, seating position, seat belt use of casualties. The discrepancies in the age data may mean that:

- 1) Teen fatalities that should have been in the review were not, or
- 2) Teen fatalities that were in the review should not have been.

However, given the cross referencing of a number of data sources to carry out this review it is believed that all cases have been captured.

For one crash there was only very limited information available on the numbers of casualties. Therefore, the data presented in the results may undercount the true numbers.

There were a number of areas on which the panel could not draw a conclusion due to a lack of information. This includes the relationships between vehicle occupants and other distractions such as music. Other information that might be available through police reports or coroner's reports could be used in future reviews. However, given that the findings of the review are consistent with the evidence identified

during the literature review, and with the findings of child death and road traffic crash risk factor reviews carried out in other countries, it seems unlikely that there are significant gaps in knowledge.

4.1 Data quality and hierarchy

STATS19 are the police crash records that are used by Department for Transport (DfT) and Local Authorities to inform road safety activity. They are the primary source of data around road traffic crashes, both in terms of fatalities and injuries, and calculations of the value of prevention of road traffic injuries are based on these data.

Road Safety Great Britain 2010 (Department for Transport, 2011), highlights a number of the limitations of STATS19 data, in particular the discrepancy between the number of serious road traffic casualties, needing hospital admission, as reported by STATS19 (20,000 in 2010 in England) and the actual numbers admitted to hospital (around 36,000 for 2010).

“It has long been known that police data does not provide a complete record of all injury accidents and resulting casualties, as the estimates illustrate. This should be borne in mind when using and analysing STATS19 data. However, STATS19 remains the most detailed, complete and reliable single source of information on road casualties covering the whole of Great Britain”

(Department for Transport, Reported road casualties Great Britain, 2011, page 7).

The thematic review also highlighted differences between the STATS19 data and the records held in the police crash investigation system. Data linkage projects often produce these types of discrepancies, with, for example, emergency department data reporting a discharge home whilst the in-patient data shows an admission. Therefore, it is of little surprise that we have differences within the police datasets and between the datasets; all are collected by different people for different purposes.

These inconsistencies were discussed in a meeting between the CDR team and South Wales Police. Where it was not possible to determine what the true record was, it was agreed that STATS19 should be regarded as correct.



Conclusions

The panel concluded, based on the data³, evidence review, and their expertise:

- Loss of control was a critical factor in many of these crashes (recorded in 13 of 28 crash reports). This is likely to relate to a lack of driving experience, and inappropriate speeds.
- Failure to wear a seatbelt was a modifiable factor in the deaths of these children and young people. At least 16 of the 34 teens who died were not wearing seat belts. This was a particular issue with back seat passengers.
- Of the vehicles in which there were fatalities, the driver was over the legal blood alcohol limit in five of the 22 cases, making alcohol consumption by the driver a modifiable factor.
- Around half (22) of all of the 45 deaths, and 13 of the 34 teen deaths, were in vehicles with five or six casualties.
- Driving at night was a key factor in these deaths; 19 of 28 crashes occurred between 21:00 and 05:00.
- There was evidence of defects in only 3 of 22 vehicles.

³ Denominators given relate to where information was available



6 Key messages

6.1 Partnership working

The panel felt that there is a need for greater coordination of effort across agencies to reduce fatalities of teenagers in cars. It was stated that there is the potential for greater involvement of health and public health professionals in road safety programmes. Finally, the role of schools and colleges in supporting road safety campaigns is important, but needs to be both consistent in delivery and with the evidence base. This engagement should be a priority at local and national levels.

Specific areas for collaboration include:

- Raising the profile of the risks of harm to teenagers in cars and factors associated with death and injury.
- Reducing alcohol related harm.

6.1.1 Procedural Response to Unexpected Death in Childhood

Ensuring that lessons should be identified via the Procedural Response to Unexpected Death in Childhood (PRUDiC) (Public Health Wales, 2010) in relation to individual child deaths through road traffic crashes.

These reviews should then feed the wider child death review process.

6.2 Interventions

There is good evidence of effectiveness for a number of interventions that could prevent the deaths of teens in cars.

Evidence based interventions that are proven to reduce deaths of young people in cars and require legislation should be actively pursued by the Welsh Government either working within its own powers, or lobbying the UK Government.

6.2.1 Graduated Driver Licensing

One intervention that the Welsh Government may lobby for is Graduated Driver Licensing or constituent elements which address:

- Limitations on driving during darkness
- Lower alcohol tolerance levels
- Limitations on passenger carriage
- Requirements for the learning process to include driving in specific settings or for a minimum number of hours

6.2.2 Telematics (Black Box Technology)

The panel recognised that the use of telematics may have good potential for reducing crash risk. It was recognised that these schemes cannot address passenger carriage and may be limited to only those young drivers who have

their own car. The panel is aware of ongoing research in this area and specifically recommends that such research consider ways to effectively implement the technology, population based outcomes and the impact on inequalities.

6.2.3 Pass Plus Cymru

Pass Plus Cymru is an education based approach. The panel welcomed the news that this scheme is to be evaluated and recommended that the findings of the evaluation be considered in conjunction with the findings of this review.

6.2.4 Enforcement

There is good evidence that enforcement can contribute to reduction in road traffic fatalities, including those of young people. The panel felt that this was a key area in which action was needed, specifically around alcohol use and speeding.

Following on from the previous key message (6.1 Partnership working) the panel suggested that any interventions implemented by partners should be robust and have clear evidence of effectiveness. Interventions that are already in place should be evaluated using hard, as well as soft outcomes, and those that are not effective should be abandoned.

6.3 Accountability and reviewing

The panel discussed the lack of accountability for identifying and implementing specific preventative interventions following a crash (see also PRUDiC process); and identified a need to review other types of road fatalities; drivers, riders, passengers, pedestrians, children, adults and older people. It also noted that there was a lack of routine review of evidence, such as that being carried out by this CDR.

6.4 Welsh Ambulance Service Trust

It was noted that some road traffic crash data are collected by the Welsh Ambulance Service Trust (WAST). The panel believed that these data could be useful to this, and other future similar reviews, providing that it is collected in a routine, consistent manner. The data available to the panel were not sufficiently robust to support this review. Further discussions between WAST and the partners (section 6.1) are now needed to support this process.

6.5 Public awareness

A number of risk factors for teen crashes and crash fatalities were identified. Greater awareness of these amongst the public is needed, and again links to the message in section 6.1. Specific areas for public awareness raising are:

- The increased risks for teens of driving, or being driven, at night.
- The risks of drinking and driving. Much has already been done, but it is clear that alcohol is still contributing to crashes and crash fatalities. This is also linked to a need to reduce consumption across the entire population.
- The importance of seat belt use for all.
- Increased risk of fatality in vehicles with multiple occupancy.

Any campaign needs to adequately consider how to make messages meaningful for teenagers, engage teenagers in the development process and evaluate its effectiveness.

6.6 Other

The panel felt that driving instructors could be instrumental in emphasising the safety benefits of using a seat belt, rather than just compliance with the law.



Recommendations

7.1 Partnership working

Existing partnerships should ensure that health and public health representations are secured and ensure that the full range of organisations involved in road safety are represented.

7.2 Interventions

The Welsh Government should actively pursue the implementation of interventions such as Graduated Driving Licensing to reduce fatalities and casualties of children and young people in vehicles. This may be through working within existing powers, seeking further or additional powers, or lobbying the UK government for changes.

7.3 Reviewing of deaths involving motor vehicles

The Welsh Government should establish mechanisms to review all road crash deaths amongst all ages on a regular basis.

7.4 Procedural response to unexpected death in childhood

Statutory agencies should ensure that a PRUDiC meeting is convened for every death involving children and young people and motor vehicles. Wherever possible, Roads Policing Officers should be invited to attend. Findings should be shared with partners and feed the Welsh Government reviews recommended in 7.3.

7.5 Enforcement

The value of enforcement in delivering safer roads needs to be more widely recognised. Roads Policing Officers need to be supported wherever possible to achieve this.

7.6 Welsh Ambulance Service Trust

Data collection by WAST should be reviewed to support its contribution to this process and partnership working in this and other areas.

7.7 Public awareness

The Welsh Government should ensure that an awareness campaign involving all partner agencies is delivered highlighting the risks to young people in motor vehicles including:

- Safety belts
- Alcohol and illegal substances and driving
- Carrying of passengers
- Night time driving.

This may also involve working with other partners to deliver safety messages, for example, driving instructors.

7.8 Research

Research is essential to achieving further gains in road safety. The panel recommends that efforts to evaluate interventions and test new and promising interventions are prioritised.

7.9 Information sharing

Information should be shared routinely with the Child Death Review team, and the Welsh Government should seek to develop explicit statutory support to this activity. In particular a mechanism should be sought to enable the Child Death Review team to obtain information from Coroner's inquests on identified cases within the thematic reviews without incurring financial costs.

7.10 Pass Plus Cymru

The Welsh Government should consider the findings of this review alongside the evaluation of Pass Plus Cymru.

References

Department for Transport. (2011). Reported road casualties in Great Britain: 2010 annual report. [Online] <http://assets.dft.gov.uk/statistics/releases/road-accidents-and-safety-annual-report-2010/rrcgb2010-00.pdf> [Accessed 29th May 2013]

Public Health Wales NHS Trust. (2013a). Child Death Review Programme. Terms of reference. Swansea:Public Health Wales NHS Trust.

Public Health Wales NHS Trust. (2013b). Child Death Review Programme. Annual report 2013. Swansea:Public Health Wales NHS Trust.

Public Health Wales NHS Trust. (2010). Procedural response to unexpected deaths in childhood. (PRUDiC). [Online] [http://nww2.nphs.wales.nhs.uk:8080/childprodocs.nsf/85c50756737f79ac80256f2700534ea3/4d3860f4fae41b4980257869004c0ee5/\\$FILE/PRUDIC%20V1%20Approve d.doc](http://nww2.nphs.wales.nhs.uk:8080/childprodocs.nsf/85c50756737f79ac80256f2700534ea3/4d3860f4fae41b4980257869004c0ee5/$FILE/PRUDIC%20V1%20Approve d.doc) [Accessed 29th May 2013]

Welsh Government. (2012). Draft Road safety delivery plan. WG16555. Cardiff: WG. Available at: <http://wales.gov.uk/docs/det/consultation/120919roadsafetydelplanen.pdf> [Accessed 29th May 2013]



GIG
CYMRU
NHS
WALES

Iechyd Cyhoeddus
Cymru
Public Health
Wales