RURAL ECONOMY AND CONNECTIVITY COMMITTEE

RESTRICTED ROADS (20 MPH SPEED LIMIT) (SCOTLAND) BILL

SUBMISSION FROM PROFESSOR ADRIAN DAVIS

Is reducing the speed limit to 20mph the best way of achieving the aims of the Bill?

I address this first question by answering different elements of the aims of the Bill drawing on both peer reviewed and grey literature evidence on 20mph speed limits.

The enhancement of road safety. First, what is road safety? Road safety can be defined this as 'freedom from the liability of exposure to harm or injury on the highway'.[i] This is in contrast to much of what is commonly misunderstood to be road safety. As researchers noted almost three decades ago, 'road safety usually means the unsafety of the road transport system'.[ii] Road safety is more than about the avoidance of being injured. It must also address the perception of risk of harm and freedom from harm and its manifestation at the individual, community and societal levels. 20mph speed limits, as noted below, are associated with perceivably less risk and a greater likelihood that some people will walk and or cycle more and this is a manifestation of enhancement of road safety.

Regarding risk of collisions and casualties, there is overwhelming evidence that lower speeds result in fewer collisions and in reduced severity of collisions including injuries.[iii, iv]

The OECD reported last year that research consistently shows that lower speeds reduce deaths and injuries, not least because there is more time to react. For example, the risk of being killed is almost 5 times higher in collisions between a car and a pedestrian at 50km/h (31mph) compared to the same type of collisions at 30 km/h (18.6mph).[v] Research by the Transport Research Laboratory has shown that for roads with low average speeds there is an average 6% reduction in collisions with each 1mph reduction in average speed.[vi, vii] This latter point is often overlooked in debates about the effectiveness of 20mph speed limits especially in the absence of three years or more of post-implementation casualty data. News media also tends to suggest that average speed reductions of 1.4 or even 2mph are trivial and have little or no value.

Yet, the evidence for reduced casualties as an outcome of 20mph speed limits is strongest.

While the need for more case-controlled studies and possibly randomisation remains, UK evidence from Portsmouth, Warrington, Bristol and Calderdale (page 4) provides consistent outcomes of declining casualties including fatalities. This does not necessarily mean that speeds driven have lowered to 20mph in free flowing traffic situations but that the drop has been significant enough to likely translate into reduced injury severity and possibly more near misses. These estimations of declining casualties are in line and triangulates with the evidence above regarding the relationship between speeds driven and collisions. This means that there is greater confidence that the reported casualty reductions are true and the risk of bias is low. It is also supported by previous research in Scotland. In 2001 a trial in Scotland of 20mph (32kph) speed limits at 78 sites found reductions in speed and casualties, with killed and serious declining from 20% of the total to 14%. The

Consultant's report concluded that such limits offer a low cost option for promoting road safety.[viii] Overall, results from the attitudinal survey demonstrated strong local support for the schemes and almost three quarters of respondents considered that the experiment had been either 'very' or 'partly' successful. Researchers have also been able to identify that 20mph speed limits have a separate effect from any Safety in Numbers effect in protecting cyclists or reducing injury events.[ix] Furthermore, casualty reduction outcomes are also supported by calls from international bodies such as the World Health Organisation for 20mph/30km/h speed limits albeit with the statement of the need for enforcement.[x]

Atkins (2010)[13] reported an average speed reduction of 1.3mph (in Portsmouth), Warrington (2010)[14] 1.45mph, Calderdale (2018)[17] 2.0mph and Bristol (2018)[16] 2.7 mph. These differences may be partly the result of the intensity of engagement with the public but other factors may be at work including that city-wide verses selected areas approaches. The Atkin study (2018) also noted that longer-term 20mph schemes which are supported by complementary transport, health, environment and community policy and interventions are likely to deliver greater benefits. Interestingly perhaps, the Bristol (2018) study also found a slight drop in speeds driven on 30mph speed limit roads. This could be due to drivers being be more conscious of their speeds. To date, this study provides the most thorough analysis of the effectiveness of 20mph in any one locality. It had the minimum of 3 years of post-intervention casualty data for much of the city.

As a coda, estimations of the likely level of lives and casualties avoided have been estimated by Jones and Brunt for Wales.[xi] This study reported that if all 30mph roads in Wales were replaced by 20mph speed limits 6–10 lives would be saved and 1200–2000 casualties avoided each year, at a prevention value of £58M–£94M each year.

Portsmouth City Council (PCC): was the first local authority in England to implement an extensive area-wide 20 mph Speed Limit scheme covering most of its residential roads which previously had a 30 mph speed limit. The implementation of the 20 mph scheme was carried out on 94% of the PCC road length (410 km of the 438 km of road length). One of the aims of the scheme was to be self-enforcing and partly to support the low driving speeds and encourage less aggressive driving behaviour.[xii] Overall there was an increase in the number of sites that demonstrated speeds of 20 mph or less after the implementation of the scheme. Many sites already had low average speeds of 20 mph or less before the scheme was implemented. At the sites monitored with higher average speeds before the scheme was introduced, there were significant reductions in average speeds. For example, for the group of sites monitored with average speeds of 24 mph or more before the scheme was introduced, the average speed reduction was 6.3 mph. The average reduction in mean speeds on all roads was 1.3 mph.

Comparing the 3 years before the scheme was implemented and the 2 years afterwards, the number of recorded road casualties has fallen by 22% from 183 per year to 142 per year, faster than the fall in casualties in comparable areas elsewhere in the country. During that period casualty numbers fell nationally – by about 14% in comparable areas. It was concluded from the figures then available that the implementation of the 20 mph Speed Limit scheme has been associated with reductions in road casualty numbers.

Warrington: The Council's report[xiii] describes outcomes of investigations into the feasibility and potential benefits of extending 20mph speed limits to all residential streets within the Borough in order to encourage an attitudinal change in drivers. Pilots were launched on 14th February 2009 and were to run for an 18 month period, the maximum length of time permitted for the 'experimental' Traffic Regulation Orders (TRO) required to make the 20mph speed limits enforceable. In summary, the results show that traffic flow reduced by an average of 2678 vehicles per week per road throughout the 3 trial areas; average speeds reduced by 1.45 mph and; a reduction of injury collision occurrence of 25.5%. Each of the trial areas saw increases in average speeds during the final monitoring stage. However, as the authors noted, it is not possible to say whether speeds will increase to their original levels without undertaking further assessment.[xiv] The report concluded that the trial of 20mph speed limits in Warrington demonstrated some undoubted benefits in terms of collision and average speed reduction. The report also concluded that the benefits that had been gained from the trial were notable, and there could be significant benefits gained through a wider roll-out. However, financial implications needed to be taken into account, particularly given the financial pressures that would be experienced over coming years.

Bristol: In July 2012, Bristol City Council voted to introduce 20mph speed limits throughout the city. This followed the completion of successful pilot schemes in South and East Bristol (based on the 2012 report above). The 20mph speed limit was introduced in six phases. The first area implemented on 20th January 2014 covered Central Bristol and borders the two pilot areas. The process of introducing 20mph limits across the city was completed in September 2015. The roll-out sought to improve health and well-being across the city, taking a holistic perspective as to how slower traffic speeds might impact on people's lives. The aim of a University of the West of England study in 2018[xv] was to evaluate the impact of the roll-out of 20mph speed limits across the city of Bristol. The methods used for the research took a holistic, public health approach to evaluation, using a variety of data sources to examine: changes in vehicle speeds; road traffic casualties; levels of walking and cycling; public perceptions and attitudes; and reported levels of health and wellbeing across the communities in Bristol before and after the introduction of 20mph speed limits.

The authors noted, it is important to noted that success is not defined by all average speeds being under the set speed limit of 20mph – it is about bringing vehicle speeds down closer to 20mph and assessing any positive impacts of that speed reduction compared to the situation before the introduction of the lower limits. I make the point here that 20mph speed limit interventions are both road safety and behaviour change interventions and that the latter, like most behaviour change, takes a significant amount of time to become embedded as the new behavioural norm.

In terms of speed, on average, according to Automatic Traffic Count (ATC) speed data (with over 36 million vehicle observations analysed) there was a statistically significant 2.7mph decrease in vehicle speeds on roads where the 20mph speed limit was introduced, when controlling for other factors that might affect speed (areas, calendar year, time of day, season, type of road, and day of week). In the areas that stayed 30mph, there was a statistically significant negligible reduction in speed (0.04 mph). Annual rates of fatal, serious, and slight injuries following the

introduction of the 20mph speed limits are lower than the respective pre-20mph limit rate, thus showing a reduction in the number of injuries.

Although the study methodology does not allow a direct causal relationship between the introduction of the 20mph speed limits and reductions in injuries to be proven, there is a very promising trend that is plausibly associated with the 20mph intervention:

- The estimated total number of injuries avoided across the city each year is 4.53 fatal, 11.3 serious, and 159.3 slight injuries.
- It is estimated that; two child lives will be saved every three years; 3 older adult lives will be saved every two years; and 3 pedestrian deaths will be avoided every year.
- More than 4 child serious injuries will be avoided in just over three years; 4 older adult lives will be saved in three years; and 2 pedestrian severe injuries will be avoided every year.
- The number of avoided slight child injuries per year is 7.68; for older adult slight injuries 25.77 will be avoided each year; and 24.54 pedestrian slight injuries will be avoided each year.

In terms of overall conclusions, the study found statistically significant reductions in average traffic speeds of 2.7mph across the city of Bristol, following the introduction of 20mph speed limits. This is a larger reduction than seen in previous evaluations in other cities. The study employed a more sophisticated analysis than previous studies of 20mph limits and controlling for other factors that might affect changes in traffic speeds.

Calderdale: A Scrutiny Report[xvi] was made in order to provide information on the impact of the 20mph schemes. At the May 2014 Cabinet meeting, the Council agreed to a phased approach for the delivery of 20mph speed limit areas on main residential streets and this was completed with the final 20mph phase implemented in December 2017. 55% of Calderdale roads are now 20mph and 71,000 (74%) households have 20mph speed limits in their area. In terms of casualty changes, casualty figures were assessed for 7 areas 3 years prior to the introduction of the 20mph area being implemented and the 3 years post introduction. For these seven areas the total number of casualties 3 years prior to installation was 171, compared to a 3 year after figure of 120 casualties. This gives a total reduction in casualties of 51 (30%) over this 3 year period.

For a further 9 areas, the total number of casualties in the 3 years prior to installation was 258, this compares to a pro-rata 3 year after figure of 155 casualties. This is based on casualty data for 2.5 years and the last 6 months was estimated to reach 3 years of data. This represents a predicted reduction of 103 casualties (40%). There was an average reduction in speed of 1.9mph across the 20mph locations resulting in an average speed of 23.2mph. Police engagement and enforcement was part of this intervention.

Atkins, 2018. 20mph research study

This study, funded by the Department for Transport, sought to evaluate the impact of 20mph schemes across the UK through case examples.[xvii] This comprised two city schemes and two small-scale residential schemes. It did not include evaluation of the research in Bristol, Warrington or Calderdale. What it reported was that 47% of drivers in residential areas and 65% of drivers in city centre areas (equating to 51%

across both categories) complied with the new 20mph limit, travelling at speeds of less than 20mph. Whilst a substantial proportion are exceeding the limit, the majority are travelling at less than 24mph (i.e. at speeds close to 20mph). Evidence from this study (and Bristol) shows that bigger speed reductions occur on faster roads, with higher volumes of traffic and providing a locally important strategic function. In terms of casualties 20mph in Brighton within Phase 1 of a scheme was the only case study area of the four where the change in collisions and casualties, relative to the 30mph comparator area were significant. The results showed a significant reduction in overall collisions (-18%), overall casualties (-19%), pedestrian casualties (-29%), and casualties aged 75 or over (-51%).

Changing driving culture and promoting compliance with speed limits
Six underlying factors affecting drivers speed choice have been identified.[xviii] These are: favourable driving conditions; unfavourable driving conditions; driver's current mood; responsibility to others; responsibility for safety of vulnerable street users; and the traffic situation. The researchers suggest that the results support the introduction of educational measures and social campaigns to cope with driving violations.

As part of my own research, the findings of repeat YouGov surveys on 20mph speed limits across Great Britain support a model of driver speeding that offers considerably more complexity than simple mechanisms of attitude predicting behaviour.[xix] A number of discriminators of the dimensions of support-opposition and compliance-non-compliance with respect to 20mph speed limits in GB were identified. Key discriminators include self-enhancement bias, social contagion, and inattentive/automatic driving. There seems to a de-coupling of attitudes and behaviour such that high numbers of drivers apparently contradict their support or opposition for 20mph limits with their actual driving.

It is proposed that a national awareness campaign is required to introduce a 20mph speed limit. Do you agree? And if so - what shape should any campaign take?
Answer: Yes. The shape of a campaign? Use social norms to influence behaviour. The rationale for this is that the creation of new urban speed limits creates a 'blank canvas' with the new 'norm' yet to be established, by the 'mainstream middle' of drivers. But who creates the new conditions of normality? It is possible to conceptualise the time just after the imposition of new speed limits as a period in which a 'battle' ensues between the two extremes - those who support the new limit and are keen to comply, those who oppose the limit and lack commitment to comply with it, and those in between these polarised positions. Whilst at the extreme we suspect Staunch Supporters are very likely to obey the limit and Staunch Opponents seem likely to break them, the middle ground is much less certain, but very important, perhaps ultimately in deciding the direction of travel of the new norm: towards general compliance, or general non-compliance.[xx]

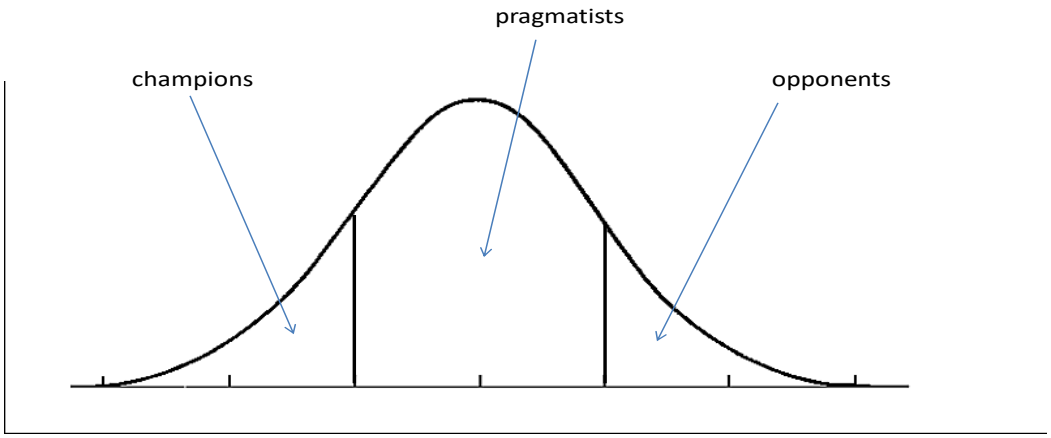
An area of my research on 20mph speed limits (with colleagues) is that of social influences: to what extent can people influence each other to comply? Once a 'critical mass' of people regards something as 'normal' the cost of conversion of new entrants into the behaviour is likely to drop dramatically as each new entrant is more likely to copycat an embedded 'new norm'. For example, if people believe that driving at 20 mph is the 'normal, everyday thing to do', and that 'everybody else' is doing it, then they are more likely to adopt this behaviour. There has been a rise in

professional interest in such interventions that seek to create the conditions for pro-social automatic behaviours because of their relative ease of application and potential cost-effectiveness. There seems little doubt that social norms are important influences on driver behaviour. Findings from our qualitative research reinforced work from others that social norms can influence choice of speed and that drivers set their speed to match the perceived speed of others.[xxi] The belief that 'most other drivers regularly speed' influences an individual's own choice of speeding behaviour; the more likely drivers are to perceive that other drivers speed, the more likely they are to speed.

Social norms tend to 'diffuse' through society (see Fig. 1 below), moving from opinion leaders (champions) to more 'mainstream' groups (pragmatists and opponents). This idea of different groups with varying attitudes to 20 mph limits emerged quite strongly from our focus groups: a wide range of levels of knowledge, understanding and liking for the idea of 20 mph limits was apparent amongst different segments. For example, mothers of young children exhibited a strong appreciation of the issues relating to 20 mph limits. Others were more neutral or indifferent, with more superficial views that seemed capable of fluctuation within the group itself, and these groups seemed to be more easily influenced. But others (for example, high mileage commuters) were more conservative, and exhibited stronger resistance to any behavioural change that the new speed limits would, in theory, force upon them. Based on these three groups, the picture that emerged seemed to be explained by the use of Rogers (1962)[xxii] Diffusion of Innovation model. Fig. 1 offers a simplified version of this model, and an illustration of how the different groups may be represented. The use of a bell curve is common in such models, but as this work is qualitative we make no such claims of accuracy here in depicting group sizes with respect to 20 mph limit influences.

How these normative messages are communicated may be crucial. For 'champion' early adopters, campaigning organisations may be appropriate, but evangelical campaigners may be off-putting for risk averse mainstream audiences. Within the mainstream, specific groups may be easier to identify and to work with and may include new parents, learner drivers, driver clubs, motoring repair organisations and so on. These groups may be approached with well-crafted social norms campaigns that emphasise the new speed limit as 'normal' and a good idea from a safety point of view. This could play on the conservative, law abiding nature of the pragmatic majority.

Figure 1: Diffusion of innovation curve applied to attitudes to 20mph speed limits[21]



A national awareness campaign needs to operate alongside **additional police enforcement action**.
The recommended strategy centres upon the use of social marketing communications to generate social disapproval of speeding in residential areas (and hence social approval of compliance). Noting that the most successful behaviour step-changes that we seek in driving have emerged from reductions in drink-driving rather than speeding, encourages examination of drink-drive campaigns in detail and to learn from these. The Think! campaign on drink-driving (Department for Transport) comprised a three-stage campaign in which messages raising awareness of risks were followed by the promotion of the social identity' change.

> Stage 1 - 'drink-driving' can lead you to kill someone (updated to 'drink driving will get you a jail sentence') was followed by
> Stage 2: 'drink-driving is not acceptable', (then 'drink-driving is not normal' (these days people don't drink-drive')) and finally by
> Stage 3: 'drink-drivers are selfish people who don't care about others' - the unacceptability (de-norming) of drink-driving.

In the light of this and other work, campaigns for 20mph limits should focus on the risks to one-self of being caught speeding. This message must have credibility and thus must be backed with a genuine threat – a form of enforcement. In tandem with the second stage of the drink-driving campaign, a second recommendation of the proposed campaign is therefore to increase the social-risk of being caught – the public shame of speeding.

Finally, mimicking the last stage of the drink-drive work, we need to bring social unacceptability from the general (society) to the specific (me). A final stage of the campaign is therefore proposed that makes clear that people who choose to speed in 20mph limits are selfish and do not share the values of the majority. The idea is that this will force individuals to confront their behaviour and test it against their self-identity as a 'good citizen' whose behaviour lives up to that label. The evidence from Think! is that, unlike the deterrent effect of fines, the deterrent effects of social disapproval are long lasting.

The social marketing activities discussed so far are primarily there to build shared beliefs that prime the public to support compliance. But communications alone cannot do the difficult job of generating compliant driving behaviour. Powerful active

interventions are likely to hinge on some kind of legal and visible enforcement – starting with the police themselves. The Atkins study (2018) noted that feedback from the case study authorities suggests that what the police say about enforcement is can be important in terms of how 20mph limits are perceived by the local community.

West Midlands Police provides a good example of where a Force has taken a positive attitude to enforcing their 20mph limits. They have a small but dedicated team deployed to this. The WMP are well known for their innovative approach to road safety including their work on encouraging cycling by enforcing laws on close-passing of cyclists (now copied in Edinburgh). Targeted enforcement such as around schools and involving schools through social media to encourage dialogue and understanding of speed enforcement without communities enables the team to reach a large number of the driving public on a daily basis and encourage dialogue including critical reactions such as 'why aren't you catching real criminals etc…' and support developing norms as discussed above.

Separately, as part of the Calderdale 20mph speed limit programme there has been significant police engagement. Police engagement and enforcement continued in 2018 via Operation Hawmill. £20k was allocated by the police and match funded by Calderdale Council. The operation ran twice a week and targets nuisance motorists and dangerous drivers and focused on the four factors most likely to contribute to a fatal road traffic collision (drink/drug use, speeding, mobile phone use whilst driving, not wearing seatbelts).

Equalities: Road traffic injury is strongly associated with poverty. Child pedestrian deaths in deprived neighbourhoods are over four times those in affluent neighbourhoods.[xxiii, xxiv] In terms of equality and diversity/equality impact assessment in Warrington it was stated that a reduction in average speed in residential areas will prevent the frequency of road traffic collisions. The use of 20mph speed limits will specifically assist vulnerable road user groups, including young and elderly pedestrians and pedal cyclists. Reducing average speed through the use of 20 mph speed limits will therefore have a positive impact on the age target group. For Bristol, the estimate was that more than 4 child serious injuries will be avoided in just over three years; 4 older adult lives will be saved in three years; and 2 pedestrian severe injuries will be avoided every year.

Inequalities exist particularly for vulnerable road users who make up over half of all casualties in cities while posing very little risk to other road users. Perceptions of risk of being injured by motorised traffic affect travel choice decisions. Reducing traffic speed and volume encourages walking and bicycling.

Sustainable development: Following from the above, research indicates that cyclists find it important to have restrictive speeds for motorised traffic when they have to share the road.[xxv] The Atkins study (2018) reported that 5% of residents surveyed said that they are walking more, and 2% said that they are cycling more, since the introduction of the 20mph limits. And the Atkins 2010 study of Portsmouth also reported that 17% of pedestrians, cyclists and public transport users reported that they had increased the amount that they travelled on foot, bicycle and public transport.

Scotland stands in a strong position with its Climate Change Act and carbon reduction target. The International Panel on Climate Change (IPCC) concluded last October that the window to limit world temperatures to under 1.5 °C and avoid the worst climate change impacts could close within the next 12 years.[xxvi] 20mph speed limits are likely to be an important, if on its own, insufficient intervention to support travel mode change away from carbon-based travel at the transformational scale now needed to tackle the climate crisis.

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