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Canolfan Polisi Cyhoeddus Cymru

20's the limit: How to encourage speed reductions

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Contents

Summary

- This report has been prepared to support the Welsh Government's plan to introduce a 20mph national default speed limit in 2022. It aims to address two main questions: 1) What specific behavioural interventions might be implemented to promote driver compliance with 20mph speed limits in residential areas; and 2) are there particular demographics, community characteristics or other features that should form the basis of a segmentation approach?

- The reasons for speeding are complex, but many behaviour change techniques have been successfully applied to road safety, including some which use behavioural insights or "nudges".

- Drivers can be segmented into three types: defiers (a small minority), conformers (the majority) and champions (a minority). Conformers are law abiding citizens who respect social norms – getting this group to comply can achieve a tipping point.

- Other sectors have shown that providing information is only effective if part of a wider package of measures and that people are most open to change at times of disruption or learning (e.g. learner drivers).

- Case studies from London, Bristol, Edinburgh and Birmingham show that enforcement, engineering and promotion used in parallel as part of a comprehensive plan are most effective. The use of technology such as Intelligent Speed Adaptation (ISA) also offers hope for the future.

- A behavioural change programme to support the Wales 20mph default should be tailored according to data on driver groups, locations and stakeholder commitment. Targeting 'average' drivers to reach a tipping point in mainstream compliance would likely be a cost-effective approach. This would include mobile vehicle activated signs, positive messaging, pop-up police enforcement, speed awareness courses and localised re-engineering of junctions/roads.

- The policy context in Wales provides a strong framework for introducing an integrated plan for a 20mph default to improve road safety, health and the environment. Achieving the required culture shift will require support from leaders across all sectors. A wide range of local and national Welsh stakeholders can be brought together around a shared vision and a five-year plan with committed resources.

- In order to monitor and evaluate the impacts of the default limit, data on speed should be collected over at least five years from 2020 to be able to showcase Wales as a national first in achieving a shift towards 20mph.

Introduction

This report details the results of a rapid review of evidence on the effectiveness of a range of behavioural interventions that could be used to secure driver compliance (post-implementation) for the proposed new default national residential speed limit of 20mph.

Review questions

In commissioning this report, Welsh Government indicated a particular interest in two main questions:

1. What specific behavioural interventions might be implemented to promote driver compliance with 20mph speed limits in residential areas?
2. Are there particular demographics, community characteristics or other features that should form the basis of a segmentation approach?

In doing so, the following questions were also suggested in the brief:

i. What evidence exists on behavioural approaches to promoting driver compliance with 20mph speed limits in residential areas?

ii. What evidence is available from wider behavioural literatures that can inform the adoption of behavioural approaches to promoting driver compliance with the revised speed limits?

iii. What lessons can be drawn from other jurisdictions that have introduced 20mph speed limits?

Method for review

The rapid review was undertaken by completing a literature review and speaking to a number of academics and practitioners. More information is available in Annex 1.

Who breaks the speed limit and why?

Who speeds?

There is a substantial body of literature exploring who speeds and why; much of the published research, however, is focused on compliance to higher posted speed limits (50, 60 or 70mph) as the transport and road safety professions are most concerned with 'risky behaviours' which lead to harm and death, or killed and seriously injured (KSIs), which can be easily measured. This research, which is summarised in the Transport Research Laboratory report on the characteristics of speeders, identified certain driver types as significantly more likely to speed:

> **"…many different people are speeders and a majority of drivers admit to speeding at some times. However, more speeders are younger males, in non-manual occupations. Company car drivers and drivers covering high annual mileages are more likely to drive faster, as are drivers travelling alone. The faster drivers tend to be in the younger age bracket; about 40 years old is the transition when drivers become 'less likely' to speed."** (Webster and Wells, 2000)

Stephen Stradling, one of the UK's leading experts on speeding, provided a profile of typical speeders to the Transport Select Committee in 2002 as described in Box 1 below:

Box 1: The characteristics of speeders

Driver Age:	**17-24 year olds fastest, then 25-58, then 58 years plus**
Sex:	**Males faster than females**
Social Class:	**A/B fastest, then C1, C2, then D/E and Retired**
Household Income:	**£30Kpa and above fastest, then £20-30Kpa, then below £20Kpa**
Domicile:	**Living out-of-town, faster**
Experience:	**1-3 years driving experience, faster**
Engine Size:	**Drivers of cars with engines 1.6 l and above, faster**
Age of Car:	**Drivers of cars 1-7 years old, faster**
Annual Mileage:	**Above 10K miles pa fastest, then 5-10K, then below 5K**
Company Car:	**Company car drivers, faster**
Drive as Work:	**Driving as part of work, faster**

Stradling, S. cited in Transport Select Committee on Reasons for Speeding, June 2002
Retrieved from: https://publications.parliament.uk/pa/cm200102/cmselect/cmtlgr/557/55706.htm#n63

Attitudes to 20mph

Recent research into 20mph limits in England found high levels of support, particularly amongst resident living in 20mph streets:

> *The most up to date study of 20mph (signs-only) limits in England, commissioned by the DfT in 2014, found high levels of post-implementation support amongst cyclists (81%), residents (75%), and non-resident drivers (66%) and little call for the limit to be changed back to 30mph (12% support amongst residents and 21% amongst non-resident drivers)*
>
> 20mph Research Report (Atkins et al., 2018)

However, it is a well-researched fact that drivers' self-reported attitudes towards speeding do not always match their actual behaviours:

> *"There seems to be 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."*
>
> Tapp et al. (2016), p.26

In other words, whilst most people *say* they support low speed limits in residential areas, there is a strong body of evidence to show that people's *actual driving* behaviour in relation to speed choice does not always correspond to their stated attitudes and beliefs. For example, despite high levels of self-reported support for 20mph limits from a number of sources, journey speed analysis of locations with 20mph limits found that median speed fell by only 0.7mph in residential areas and 0.9mph in city centre areas (Atkins et al., 2018). This is known by psychologists as the intention-behaviour gap and it is an important phenomenon which needs to be addressed to achieve compliance with 20mph limits.

Attitudes to, and the psychology of, speeding are explored in detail in Annex 2 but one of the most common reasons that people speed is they feel social pressure from other drivers. This was one of the key findings from a qualitative survey of drivers in London (see Box 2).

Box 2: Attitudes to 20mph in Haringey, London

A survey of 4,589 Haringey residents found that many drivers had had bad experiences driving in 20mph areas in the neighbouring borough of Islington:

> ***"...I do keep within the 20mph limit on side roads; however other drivers often tailgate or try to overtake me"***
>
> ***"…I feel 20mph speed limits on all roads will lead to driver frustration and dangerous driving"***
>
> ***"I have drivers hooting behind me when I stick to 20 in Priory Rd…"***

Sustainable Transport Report - A 20mph speed limit in Haringey? Haringey Council, 2013

The Welsh context

An innovative policy environment

The decision to introduce a national default 20mph speed limit in Wales is a bold and radical step, indeed a world first. It signals the Welsh Government's genuine commitment to take action to make Wales a liveable country with a high quality of life for all and builds on the innovative approaches already taken, such as legislating for the Well-being of Future Generations (Wales) Act 2015.[1] Other innovative steps have included the introduction of a plastic bag levy in 2011[2] and a move to default or deemed organ donation consent with the Human Transplantation (Wales) Act 2013.[3]

The new 20mph default which is due to be introduced in 2022, is underpinned by expert research in the fields of road safety, active travel and air pollution (Davis, 2018) as well as public health (Jones and Brunt, 2017) and is being driven by strong political vision and leadership.[4]

[1] https://futuregenerations.wales/about-us/future-generations-act/
[2] https://www.bbc.co.uk/news/uk-wales-47481248
[3] https://gov.wales/sites/default/files/publications/2018-07/140107-taking-organ-transplantation-to-2020.pdf
[4] https://www.bbc.co.uk/news/uk-wales-politics-48188233

The new lower limit will require strategic leadership and high-level support – for example from Wales's four Police and Crime Commissioners – to signal the seriousness of the commitment and help win public support to achieve a significant culture shift across Wales. It should be possible to build on the successes of previous, nation-wide societal changes (see later section on 'Learning from other sectors?').

Speed limit compliance

The website for Welsh Government statistics – **www.statswales.gov.uk** – provides data on motoring offences including issues of fixed penalty notices and driver retraining for speed limit offences. The data do not differentiate between offences in different speed limits, so it is not possible to get a picture of the number of offences committed in 30mph limits. There are, however, data available on the number of collisions by speed limit[5] and the number of casualties by speed limit.[6] These could be analysed to build up a more detailed picture of current speeding infringements across the four Welsh police force areas.

It is worth noting the high degree of harm inherent in driving at 30mph; for example, in 2018 across Wales there were a total of 2,282 collisions, 462 killed and seriously injured and 2,411 slightly injured in 30mph limits. We could expect a lower number of collisions and casualties in 20mph limits. One fatality is estimated to cost £1.96m, meaning any reduction in road casualties also carries significant benefits in monetary terms (DfT, 2019).

The Welsh Government will need to decide what level of compliance they are aiming for and then allocate sufficient resources to support that change. Based on expert opinion in a background paper focusing on the communication of 20mph limits, a suggested target for a reduction in average speeds could be between 5 and 8mph (Tapp and Davis, 2019). A reduction of 5-8mph is an estimate of what might be achieved with a mix of interventions, including adequate police enforcement and a significant number of pace cars (see Annex 1).

Attitudes to 20mph

Data collected by Cardiff Council as part of their Ask Cardiff annual survey indicated high level of support for Cardiff's 20mph programme, which is now well advanced. Between 60-64% of respondents supported the introduction of 20mph speed limits in Cardiff between 2013-2016, 26-30% did not support the introduction, and 8-10% did not know.[7]

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[5] https://statswales.gov.wales/Catalogue/Transport/Roads/Road-Accidents/accidents/numberofaccidents-by-speedlimit-severityofaccident-date-policeforcearea
[6] https://statswales.gov.wales/Catalogue/Transport/Roads/Road-Accidents/Casualties/numberofcasualties-by-speedlimit-typeofvehicle-severity-date-area
[7] Non-published data provided by Cardiff Council

The only current data available that provides a further breakdown on public attitudes to 20mph in Wales are based on a YouGov 2017 survey of GB adults, however the Wales sample only includes 145 people so is not appropriate for detailed analysis (Tapp et al., 2015). Nevertheless, some conclusions can be drawn from it, including the following observations about demographic differences in support for 20mph for Wales (Tapp and Davis, 2019):

- **Women are more likely to support 20mph than men**: 58% of men supported 20mph compared to 69% of women (with 64% supporting overall).
- **Older adults are more likely to support 20mph limits**, but while *strong* support is less likely amongst younger adults this does not lead to increases in strong opposition; instead, younger adults are more likely to *slightly* support/*slightly* oppose 20mph limits.
- **Social class does not seem to be a strong factor** in predicting support or opposition.
- **Voting intention did quite strongly predict 20mph support**. Labour, Liberal Democrat and Green Party voters were more likely to support; Conservative and UKIP voters were less likely to support.
- **There were no significant differences in support between urban/suburban and rural groups**. The rural nature of Wales makes this an important finding to double check with a larger Wales sample.
- **Drivers were more likely to oppose 20mph than non-drivers**, and opposition to 20mph grew with higher levels of mileage.
- **Support for 20mph limits was higher amongst people who live on 20mph streets.** The Atkins et al. 20mph research report (2018) confirmed that the lived experience of 20mph limits increases their popularity.

These findings are in alignment with evidence from the wider body of research on attitudes to speeding and 20mph (as detailed in earlier sections). There will be some important aspects to investigate further, including the attitudes of young people and people living in urban versus rural areas. These are included in the Welsh Government-funded Omnibus survey of 1,000 respondents, which will provide a rich and new dataset on Welsh residents' attitudes to 20mph. These data will lead to further insights into how to effectively target and segment 20mph messages and behaviour change interventions. The results will also provide an important baseline against which to monitor and evaluate how attitudes change over time once the default limit of 20mph is introduced.

Evidence-led narrative for 20mph compliance

The psychological model of driver behaviour, based on the Theory of Planned Behaviour as illustrated and discussed in Annex 2, can help frame opportunities to develop a narrative of compliance to a 20mph default speed limit. These are summarised in Box 3 and later in the report they are linked to the type of interventions that have already been shown to work in getting compliance with 20mph limits.

Box 3: Narrative for 20mph compliance

Area of influence	Current narrative	Evidence-led narrative to promote 20mph
Norms	Breaking the speed limit is normal	Driving at 20mph is the new normal for everyone in Wales
Control	I am a better than average driver, the limits don't apply to me	Skilful drivers are able to stick to 20mph where people live
Self-identity	I do speed but that doesn't make me a criminal	Breaking the 20mph limit is a crime and will be enforced
Attitudes (thinking)	I support 20mph – where I think it's appropriate	Everyone deserves a safe 20mph neighbourhood – your speed makes a difference in every street
Attitudes (feeling)	30 (20) mph feels so slow it's frustrating	Calmer driving at 20mph is less stressful for you and everyone out and about

Changing driver behaviour

The underlying psycho-social theories and models that are used to explain why people break the speed limit, as described in Annex 2, are complex and there is no 'one size fits all' approach. This is particularly the case for 20mph compliance which is still a relatively new area of academic research.

This section looks at how the available evidence can be used to change driver behaviour and draws on Dr Fiona Fylan's RAC behaviour change techniques guidance (2019) as well as other literature.

Behaviour Change Techniques

Behaviour Change Techniques (BCTs) are defined by Fylan as the 'active ingredients' of a road safety intervention – the things that bring about change. Most interventions will use a combination of techniques to bring about a change in behaviour; for example, to achieve compliance with 20mph, the minimum BCT would be to install mandatory speed limit signs. However, there is plenty of evidence that signs alone only have a limited effect on drivers' behaviour and that in order to get sustained compliance, the intervention needs to use a range of supporting BCTs (Toy et al., 2014; Atkins et al., 2018). The RAC guide sets out 93 discrete BCTs arranged in 16 groups but fortunately goes on to identify, based on evidence, the ten most effective BCTs. These are briefly summarised in Box 4 with some ideas on how they might be applied in practice to a 20mph behaviour change intervention.

Behavioural insights

Behavioural insights, drawing on psychology, social science, behavioural science and economics, is an approach to public policy that can encourage people to "make better choices for themselves and society"[8] by influencing their subconscious or automatic behaviours. The approach is based on theories such as Prospect Theory (Kahneman and Tversky, 1979) and Intertemporal Choice (Loewenstein and Prelec, 1992) and was more recently brought to wider public awareness in the widely acclaimed books *Nudge* (Thaler and Sunnstein, 2008) and *Thinking Fast and Slow* (Kahneman, 2012). The establishment of the

[8] https://www.local.gov.uk/our-support/efficiency-and-income-generation/behavioural-insights/what-are-behavioural-insights

Behavioural Insights Team or 'Nudge Unit' in The Cabinet Office in 2010[9] was a validation of this approach.

The nudge approach has now been tested in many fields of public policy (including pensions, organ donation and taxation) and a great deal has been learned about the pros and cons of using behavioural insights over the past ten years (Sanders et al., 2018).

In the context of 20mph compliance there are some useful ideas in the RAC guide about how to apply behavioural insights, or 'choice architecture' as it is sometimes known, to aspects of road safety (Fylan, 2019). The guide has identified six common biases that influence people's sub-conscious behaviour. Box 5 below summarises these six biases and includes an additional two – cognitive dissonance and habit – not referenced in the RAC guide. The relevance of each of these biases in designing a 20mph intervention is considered and will be referred back to later in this report in the section on 'what works'.

[9] https://www.theguardian.com/politics/2013/may/02/nudge-unit-has-it-worked

Box 4: Top 10 most effective behaviour change techniques

Name of BCT	Description of technique	Relevant to 20mph (e.g.)
Goal setting (behaviour)	Set goal in relation to the desired behaviour	Pledge intention to stick to 20mph limit
Problem-solving	Identify solutions and strategies to achieve goal	Use an in-car app, drive in a lower gear
Goal setting (outcome)	Set goal in relation to positive outcome	Be a good neighbour – keep the speedometer on 20mph
Feedback on behaviour	Monitor/observe and give feedback on actual behaviour	Use of tech – ISA, apps, Vehicle Activated Signs
Self-monitor behaviour	Establish a method to self-assess behaviour	Don't speed up towards green traffic lights
Self-monitor outcome	Establish a method to self-assess outcome of behaviour	Notice smoother driving style, less acceleration
Feedback on outcomes	Monitor and provide feedback on outcome of behaviour	ISA, in-car app, lower fuel consumption
Unspecified support	Social support provided by friends, colleagues, peers	Positive social media messages, word of mouth
Practical support	Practical support provided by friends, colleagues, peers	Social media groups, police advice on hot spots
Information about consequences	Provide information on impact of positive behaviour	Fewer KSIs, feedback from non-car drivers

Box 5: Using behavioural insights to design a 20mph intervention

Type of Bias	Description	Relevance to 20mph
Loss aversion	"Losses loom larger than gains" (Kahneman and Tversky, 1979). It is thought that the pain of losing is psychologically about twice as powerful as the pleasure of gaining	Address drivers' perceived losses e.g. longer journey times and freedom to choose speed by countering with positive gains – fewer collisions and safer, more liveable streets
Status quo	People prefer to do nothing, and have inertia to change, even when the change might be to their advantage	Make it as easy as possible for drivers to change: the nationwide 20mph default will help with this as it is a clear and simple instruction, not a choice. In the long term it will create a new status quo
Priming	People can be positively influenced, or 'primed', by information or by their physical or emotional environment before they are asked to engage in a new behaviour	Use positive imagery to promote liveable 20mph streets and alter the look and feel of roads to make drivers feel like guests
Herd behaviour	People tend to go with the flow and do what others are doing rather than risk standing out or being criticised by friends (social norming)	If at least a proportion of the driving population drives at 20mph then this can create a noticeable change leading to a new social norm
Optimism bias	People overestimate the probability of positive things and underestimate the probability of negative things happening to them in the future	This bias makes people less likely to accept the importance of (them) driving at 20mph so undermines the power of road safety messages
Creating meaning/ attribution bias	When something happens, we need to make sense of it; we often do so by blaming circumstances in our own case but individual behaviour in others	Not directly applicable for 20mph compliance
Cognitive dissonance	The tension or feeling of hypocrisy arising from having two simultaneous and conflicting ideas or feelings – often as a person realises that s/he has engaged in a behaviour inconsistent with the type of person s/he would like to be or be seen as (Fointiat, 2004)	This bias can be used to help drivers realise that if they support 20mph in theory then they should stick to the limit in practice
Habit	Habit is automatic behaviour requiring limited cognition which is acquired through repetition	Driving at 20mph requires conscious behaviour to acquire a new habit – unexpected reminders and cues e.g. Vehicle Activated Signs can engage the driver's conscious brain

Targeted segmentation

The previous sections have highlighted that some drivers – such as young males or high mileage commuters – are more likely than other groups of drivers to break the speed limit. However, it is important to note that most of this research is concerned with higher speed limits. There is very limited data on who speeds, or complies, at lower speeds such as 20mph and 30mph. This is a significant gap in the evidence base and it is important to consider the extent to which the evidence is relatable.

Defiers

Some conclusions can be drawn based on the evidence, for example that there will be a group of drivers who will refuse to comply with the 20mph speed limit. These are described by Coogan et al. (2014) as high-risk drivers. Their research identifies three separate and distinct dangerous traffic safety cultures: first, a culture of risky driving dominated by excitement seeking and optimism bias; a second dominated by denial of societal values; and a third characterised by its propensity to find rational justifications for its speeding behaviour. The drivers in all three groups are likely to respond only to stringent and repeated enforcement.

It is difficult, without further data, to estimate what proportion of drivers in Wales might fall into the third category but there is a risk it could be significant enough to undermine the 20mph default if not dealt with decisively.

Champions

At the other end of the spectrum, there will be a group of drivers who are enthusiastic supporters of 20mph; these will be supportive for different reasons, for example because they are 'aspiring environmentalists' (Anable, 2005) or perhaps because they are older, less confident drivers (Chevalier et al., 2016). This collective group, whatever their motives for being pro-20mph, will be highly useful champions and advocates who can help to influence the public debate whilst also acting as informal pace cars on the roads. Again, it is not possible to estimate what proportion of drivers in Wales will fall into this category but, learning from other places such as Bristol and Calderdale that are several years post-implementation, they can be expected to be significant enough to have a positive impact and should be nurtured and valued in any planned interventions.

Conformers

The vast majority of drivers are law abiding, are happy to follow the herd and, as found by the British Crime Survey, believe that speeding is an antisocial behaviour and support police enforcement of 30mph (Poulter and McKenna, 2007 – see Annex 2 for more information). This group of drivers tends to break the speed limit only because they feel the pressure to "…keep up with traffic flow and perceived pressure to drive faster" (Fleiter et al., 2010) and "…follow the traffic rhythm better" (Warner, Wallen and Aberg, 2008). This implies that they would be willing to drive at 20mph if that was the prevailing speed, in other words the new norm. Arriving at this tipping point will require empowering this silent majority, as Tapp et al. (2016) concluded:

> **"…these groups 'in the middle' may be very important, perhaps deciding the shift towards either normative compliance or non-compliance."** (Tapp et al., 2016)

The question, which the remainder of this report aims to address, is how can this tipping point be achieved?

Contradictions

The research carried out by Tapp et al. (2016) using a population-wide survey of GB drivers to explore how support and compliance were interlinked found a complex relationship between attitudes and behaviour which will only be understood through further qualitative and quantitative data collection.

Learning from other sectors?

The brief for this review includes the question 'What evidence is available from wider behavioural literatures that can inform the adoption of behavioural approaches to promoting driver compliance with the revised speed limits?'. This is certainly worth considering as behaviour change theories and approaches are applied to many human behaviours, not just speeding. This review did not identify any interventions that are directly transferrable from one sector to another. For example, the plastic bag levy introduced by the Welsh Government in 2011 catalysed a significant and rapid shift in behaviour but, according to research by Thomas et al. (2016) it did not lead to 'spillover' behaviour change effects in other areas due to the fact that it was extrinsically (fiscally) motivated. In comparison, the effects of economic incentives to deter speeding remain inconclusive. For example, one study found that the offer of a 30% discount on insurance was not enough to sell Intelligent Speed Assistance (ISA) to young car owners (Lahrmann et al., 2012) whilst another study, also offering a 30% discount on insurance, led to an 8% reduction in speeding (Stigson et al.,

2014). Clearly the design of the intervention is important to motivate, and then sustain, behaviour change.

Other population-wide behaviour change initiatives such as the organ donation deemed consent (Albertson, 2017) and automatic enrolment of pensions (Cribb, 2016) rely on the behavioural insight 'nudge' principle that people prefer not to take action and rely on the status quo. In both cases the intended nudge has been successful: Wales now has more registered donors, and workplace pensions among eligible private sector workers is estimated to have increased by 37 percentage points. But does this type of nudge translate to 20mph compliance? The proposal for a national default limit will certainly send out a strong signal for a new status quo, but the challenge is that drivers have a 30mph (or faster) habit that the new default alone cannot overcome. In the long term the fact that the limit is the national default (as opposed to a locally set limit) will certainly help with clarity of messaging and enforcement but much effort will need to be invested in achieving the culture shift.

There are some broader, more generic lessons from other behaviour change work that can help to inform the design of the 20mph programme. The work of CAST, a global hub for understanding the social science of climate action based at Cardiff University,[10] has developed many valuable insights. For example, information alone will not shift behaviours unless it forms part of a system-wide approach and habits are best broken at times of disruption or formed from scratch in the case of learner drivers.

[10] https://cast.ac.uk

Getting 20mph compliance – what works?

This section of the report is focused on practical examples where slower speeds have been achieved through the introduction of behavioural interventions. The examples, backed up by academic research and evidence, can inform a set of evidence-based behavioural interventions – a 20mph behaviour change toolkit – that will help to get 20mph compliance in Wales.

Some of the initiatives reported here have been tested and implemented by practitioners in the field but lack a formal academic evaluation. This, as Michael Sanders et al. (2018) describe in their paper on their work with the Behavioural Insights Team (BIT), is often the case with innovative and leading-edge work:

> **"Rather than publishing peer-reviewed research that may then influence government action, they may alter government actions and then attempt to publish the results in peer-reviewed journals. In other words, the impact comes first."** (Sanders et al., 2018)

As the 20mph limit is still a relatively new concept in the UK many of the lessons being learnt have not yet been fully researched or documented. So, some of the initiatives discussed here are based on talking directly to experienced practitioners about what has worked in their areas.

There are three distinct approaches to influencing behaviour discussed in this section, with technology being a fourth approach that may offer support in the future:

1. Enforcement
2. Engineering
3. Promotion
4. Future technology

A rapidly emerging approach explored in the fourth part of this section is the 'techno-fix'; Intelligent Speed Adaptation (ISA)[11] will be required by EU law to be installed in all cars by 2022 and other technology such as SPECS cameras and in-car apps are already readily available and being deployed in some areas.

[11] https://industryeurope.com/eu-rules-intelligent-speed-assistance-in-all-new-cars-by-2022/

Although each approach is discussed separately in this report, it is vital that all elements are deployed in parallel as part of a multi-stakeholder speed reduction plan; they all support each other but have less impact if deployed separately. The call for an integrated approach is a common theme across many of the papers reviewed (ACPO, 2013; Arnott et al., 2013; Hyden, 2020; Musselwhite et al., 2010; Stradling, 2007; Tapp et al., 2016; Turner, 2018; SWOV, 2018; Webster and Wells, 2010; WHO, 2017).

Enforcement

Self-enforcing roads?

The Welsh Government guidance on 20mph limits was published in 2009 replacing previous guidance from the 1993 Department of Transport/Welsh Office guidance (see Box 6 below).

The guidance refers to the use of 'limits' and 'zones' where limits indicate use of speed limits, indicated by terminal and repeater signs alone; and zones are a zonal approach using terminal signs together with suitable traffic calming measures to provide a self-enforcing element.

The current guidance for rural areas states that 30mph is the norm for villages and that 20mph is by exception only.

Box 6: Current Welsh Government guidance on urban 20mph speed limits and zones

5.6 **Highway authorities may implement 20mph speed limits and zones where appropriate, particularly in residential areas, and this is encouraged and supported by the Welsh Assembly Government. Such limits may either be full time or restricted to specified hours of the day.**

5.7 **20mph speed limits may be used on trunk roads in exceptional circumstances, generally over short lengths and for limited times of the day.**

5.8 **To be successful, 20mph speed limits and zones should ideally be self-enforcing. Highway authorities should take account of the level of police enforcement required before installing either of these measures and must always formally consult the police when considering their use.**

5.9 **Where highway authorities introduce 20mph speed limits for part of the day (e.g. around school hours), care should be taken to ensure that signing is clear and unambiguous to drivers**

5.10 **20mph speed limits should only be used for individual roads or for a small network of roads. Research indicates that 20mph speed limits should only be used where mean vehicle speeds are 24mph or below or where traffic calming measures are planned as part of the speed management strategy.**

5.11 **20mph zones have a proven casualty reduction benefit and are usually used in town centres, residential areas and in the vicinity of schools. Their purpose is to create conditions in which drivers naturally drive at around 20mph largely due to vulnerable road user activity.**

Welsh Assembly Government, Setting Local Speed Limits in Wales, Circular No: 24/2009

The idea behind 20mph roads being 'self-enforcing' 20mph limits is that it is a low-cost option that minimises the need for police enforcement. However, Atkins et al.'s (2018) research into signs-only 20mph limits found that the median speed fell by only 0.7mph in residential areas and 0.9mph in city centre areas. The researchers concluded that: "road characteristics have a much larger impact on the speeds that drivers choose to adopt than whether the road has a 30mph or 20mph limit". This implies that the typical urban residential road built post-1935, that have been designed for 30mph speeds, [12] will not get compliance with 20mph limits through signs alone. The re-engineering of roads designed for 30mph speeds that "…don't feel like/look like the [20mph] limit" (ACPO, 2013) is extremely costly. Some suggestions for low-cost techniques are described in the engineering section below.

Signage

Regulations for 20mph road signage in Wales are set out in the Traffic Signs Regulations and General Directions 2016 (DfT, 2016). The prescribed levels of signage for 20mph limits and zones have been relaxed from previous guidance to make it easier for local authorities to implement 20mph limits or zones where appropriate. The minimum signage required is now:

- One terminal sign at entry and exit to a 20mph area or zone;

And in addition, for zones:

- One repeater sign or roundel every 100m; and
- At least one traffic calming feature.

In Wales, with the introduction of a nation-wide default, it is likely that new or additional local guidance may need to be developed to ensure that there is sufficient awareness amongst all drivers. As noted in Atkins et al.'s report (2018), although the signage requirements have been relaxed, a cautious approach should be taken to adopting a minimal signing strategy, at least in the short to medium term as it may reduce levels of driver awareness.

In addition to statutory signage, the use of Vehicle Activated Signs (VAS) has been found to be effective in raising awareness of 20mph limits at some locations including Bristol, Calderdale and Edinburgh. The evidence from monitoring effects at the locations of VAS is that they achieve substantial speed reductions for short periods, but this effect wears off after a few weeks and the locations need to be constantly changed to sustain the benefits (Atkins et al., 2018; Toy, 2014).

[12] The Traffic Act (1934) imposed a speed limit of 30mph upon roads in built-up areas.

Policing

The police, with their thinly stretched resources, have made it clear that expectations in relation to their role in enforcing 20mph enforcement need to be managed. In the early days of 20mph there were areas where the police claimed the limits "were not enforceable".[13] Subsequently, the Association of Chief Police Officers (ACPO) have reviewed their formal stance and, in an addendum to their Speed Enforcement Guidance they state:

> *"It is very important that the service doesn't unintentionally give the impression that the police will not enforce the law. As with all crimes and all speed limits the police will use their discretion when to enforce and how that enforcement might take place. Unclear or confusing limits (all limits not just 20's) will undoubtedly lead to mistaken offending and any aggressive enforcement risks a loss of public support for the action and more importantly the police service. Enforcement cannot and must not take the place of proper engineering and or clear signing."*
>
> ACPO Speed Enforcement Guidance, Appendix A (2013)

Whilst this appears to be a reasonable position to take it is important to note that, as highlighted in the Atkins research, the 'proper engineering' that ACPO call for would require many miles of 30mph roads to be re-designed as 20mph streets in order for them to be self-enforcing. This is simply unaffordable and so enforcement, whether by the police or an alternative authorised body, has to be part of the compliance 'package' to get drivers to change their driving habits.

There are some excellent examples of police forces that have led the way in policing 20mph, notably the West Midlands police force which has taken an extremely proactive stance to policing 20mph in partnership with the local road safety partnership Birmingham Connected. An interview was conducted with PC Mark Hodson of the West Midlands Police and is summarised in Box 7. It is worth noting that this approach had top-down support from the West Midlands Police and Crime Commissioner David Jamieson who is a former transport minister.

Other police forces which are also known to have taken a proactive approach to enforcement of 20mph include Surrey Police Force as part of the Drive SMART partnership,[14] in

[13] http://www.20splenty.org/police_enforcement

[14] https://www.surreycc.gov.uk/__data/assets/pdf_file/0005/208931/SurreyDriveSMARTRoadSafetyStrategyver5.pdf

Calderdale via Operation Hawmill[15] and in Edinburgh through an innovative service level agreement with the City Council.[16]

Police enforcement will not just happen unless resource is allocated to it; for example Transport for London have funded the Metropolitan Police to enforce 20mph because they have found the police have the moral authority and can be deployed in an agile way to areas where speeding incidents are reported.

Box 7: Policing 20mph in the West Midlands

The West Midlands Police Road Harm Reduction Team believe that enforcing 20mph matters. It fits with the core policing value of Public Service to: "…act in the best interests of society as a whole"[17] by making the roads safer for everyone and increasing levels of walking and cycling which in turn increases the 'eyes and ears' or informal surveillance which reduce other forms of crime on the streets.

The team of six, which currently prosecutes 800-1000 drivers a year in 20mph limits, takes an evidence-based approach with their limited resources; the officers prioritise enforcement at sites of collisions or at the request of communities. They also focus on bus and taxi drivers who will effectively spread the word and tend to comply when reminded thus having a pace car effect. They have trained up many Community Speed Watch groups to target problem neighbourhoods and, to get the message across in more diverse parts of their region, they have teamed up with local community groups such as the Bearded Broz.[18]

Their innovative approach is getting results: they have seen a 1mph reduction in average speeds and a 6% reduction in pedestrians killed and seriously injured.

Source: Telephone call with PC, West Midlands Police Road Harm Reduction Team

[15] https://calderdale.gov.uk/council/councillors/councilmeetings/agendas-detail.jsp?meeting=24991
[16] https://roadsafetygb.org.uk/news/police-to-enforce-edinburgh-s-20mph-limits-3619/
[17] https://www.college.police.uk/What-we-do/Development/competency-and-values-framework/Documents/Competency-and-Values-Framework-for-Policing_4.11.16.pdf
[18] https://www.beardedbroz.com

Community enforcement

As the example from the West Midlands Police shows, much can be achieved with limited police resources. Many local residents are keen to get actively involved in promoting 20mph and there are many examples of local initiatives to empower community groups or individuals to act including:

Community Speed Watch[19]

Community Speed Watch (CSW) is a national initiative which is a partnership between local people, the police, the fire service and local councils. Volunteers are trained by the police and then spend a short time each week monitoring speeds and noting number plates on their local street. Those identified as speeding are sent a warning letter and the police will take further action if the same vehicle is identified as speeding three times. This approach is only used up to speed limits of 40mph. In London, primary school children are invited to join a Junior Roadwatch initiative[20] to reduce speeding near their schools.

There is almost no formal research into the effectiveness of this approach and there is little evidence of the extent to which persistent offenders are ultimately penalised by the police. A paper by a road policing academic suggests that, despite this uncertainty, CSW is popular with Police and Crime Commissioners and Chief Constables who are often asked by the public to 'do something' about speeding and that it appeals as a tool “to negotiate the often-conflicting demands placed upon them in straightened economic circumstances” (Wells, 2019). It was highlighted during the roundtable discussion convened for the development of this report that, if used, CSW should form part of a package of interventions, and should not be seen as a replacement for effective police enforcement, or a method of pacifying concerned communities. Rather, it should be viewed as a positive method of involving the community in the successful implementation of 20mph limits. The roundtable experts also agreed that CSW tends to be more popular in affluent areas and may not work in areas of deprivation where casualty rates are often higher.

Operation SNAP[21]

Originally launched by the police in Wales as a way of using the increasing number of photos and video footage that are generated by dashboard cameras as evidence, Operation SNAP has now been taken up nationally. It provides a streamlined process to deal with the footage submitted by the public in relation to a number of driving offences including: dangerous driving; driving without due care and attention; careless driving; using a mobile phone; not

[19] https://www.communityspeedwatch.org
[20] https://tfl.gov.uk/corporate/safety-and-security/road-safety/community-roadwatch
[21] https://www.bbc.co.uk/news/uk-wales-46424514

wearing a seat belt; contravening a red traffic light; contravening solid white lines; and other offences where the driver is clearly not in proper control of the vehicle. Many of these drivers are likely to be the 'defiers and manipulators' identified in Corbett's (2000) paper who consistently flout traffic regulations and need to be the focus of police enforcement. It is not yet clear how useful this kind of footage might be in catching speeders in 20mph limits.

Kid's Court[22]

This approach has been used in Liverpool (Atkins et al., 2018) and the West Midlands to get school children involved in policing the roads around their school. The police conducted a speed enforcement operation near the school and then the offenders had the choice of being fined or going into the school to face the Kid's Court. Anecdotally it had a powerful effect on drivers who are parents or grandparents but had less impact on young offenders.

In summary, enforcement is a vital component of achieving 20mph compliance and there are examples of best practice that can be achieved, with limited police resources, to send out a strong signal to the public that breaking a 20mph limit is illegal and will not be ignored.

Community-based enforcement in Rodborough[23,24]

An innovative approach to community-based enforcement has been pioneered by Charles Pedrick, a Parish Councillor for Rodborough, near Stroud. He has been working in partnership with the Gloucestershire Constabulary since 2014 to develop an automated system to improve the area's local community speed watch. The system uses a non-DfT type approved automated speed camera linked to the police's Automatic Number Plate Recognition (ANPR) database to identify recurrent speeders. The worst offenders are contacted and visited in their home by the Councillor and a police officer to discuss their speeding and to ask them to observe the limits. The impact has been significant, with 90% of visited drivers subsequently changing their behaviour. This is a low-cost approach (one camera costs approximately £7,000 plus VAT) and has the potential to be replicated in other areas or even at a national level.

This type of personal approach is advocated by PATROL[25] who work with local authorities on traffic management and parking enforcement issues. For example, Durham County Council send drivers who contravene their road user charging zone a warning letter along the lines of

[22] https://www.youtube.com/watch?v=SRyVLoivpVg
[23] https://www.grcc.org.uk/downloads/cars/rodborough-pilot--automatic-number-plate-recognition-cameras.pdf
[24] http://www.safe-speed.com
[25] https://www.patrol-uk.info

“We hope you enjoyed your visit to Durham but next time…”. They have received thank you letters from recipients for this approach.

Engineering

As already described in the previous section, a self-enforcing 20mph road is one that has been specifically engineered so it has the ‘look and feel’ of a 20mph road. Some countries like the Netherlands, who pioneered the Woonerf – a living street or home zone where cars are required to proceed at walking speed – have been actively re-engineering their urban roads for people (not cars) since the 1970s (Lydiard and Garcia, 2015).

In the UK, we have started to think about putting place status (i.e. the significance of a street, junction or part of a street) above network efficiency in urban streets, but most roads still prioritise the movement of cars at pre-determined speeds – typically 30mph for our residential areas (Carmona, 2017). This means that the visual cues to drivers make it hard for people to drive at speeds slower than the design speed of 30mph. The approach that has been taken in the Netherlands to designing 30 km/h roads is described in Box 8.

Box 8: Learning from The Netherlands

Many of the 30 km/h zones and roads have a ‘sober’ (not optimally safe) layout and have insufficient physical speed inhibitors (humps, chicanes, road narrowings, plateaus). These inhibitors tend to be missing on straight road stretches in particular. An increase in such speed inhibitors contribute to reduction of the driving speed, as can making the 30 km/h limit more credible e.g. through a narrowing of roads, offering one lane for both directions, avoiding long straight road stretches and the use of brick pavement instead of asphalt. SWOV (Institute for Road Safety Research) has previously calculated that if all 30 km/h roads had a credible limit, this would prevent about 200 serious road injuries annually, especially among cyclists.

SWOV Fact Sheet, Zones 30: Urban Residential Areas (2018)[26]

[26] https://www.swov.nl/en/facts-figures/factsheet/30-kmh-zones

There is strong evidence from the literature that visual cues are an important factor in drivers' speed choice (Maroney and Dewar, 1987; Ahie, 2015; Lee, 2017) and that, for a 20mph limit to be a 'credible speed choice', it needs to look and feel like the car is the guest (Lee, 2017).

The traditional methods of creating a traffic-calmed street or home zone (with surface treatments, vertical and horizontal deflections) require re-engineering the street which is very expensive and there is still a lack of evidence of their cost-effectiveness in delivering road safety and public health outcomes. A detailed evaluation of 24 such schemes in the UK concluded that:

> **"…the cost-effectiveness or cost-benefit of certain types of road design-based intervention appear not to have been conducted anywhere yet, e.g. Home Zones, 'quiet lanes', mandatory 20mph speed limits (i.e. without traffic calming features)…There appears to be a paucity of cost-effectiveness analyses of traffic calming and other road safety interventions."** (NICE, 2009)

In an interesting study, Garrod (2002) found that residents in English towns are willing to pay for reductions in traffic impacts including noise, speeding and community severance.

Transport for London, as part of their Vision Zero strategy to eliminate deaths and injuries on their road network, is transforming 73 of the city's most dangerous junctions ready for the 20mph limit.[27] Wales will need to carry out a similar risk-based analysis to prioritise junctions and sections of road that will need to be transformed to provide all users with a safe, low-speed (20mph) environment.

There are low-cost ways of altering the look and feel of a traditionally engineered street, and these techniques, pioneered by organisations such as Sustrans with their DIY Streets approach,[28] can be useful in slowing speeds on residential streets. These types of intervention include measures such as the:

- reallocation of road space (for pedestrians, cyclists, bike stands, planters, bins, food growing etc.) using low-cost materials
- rearrangement of existing on-street parking (e.g. from parallel parking to echelon style) to reduce sight lines
- use of road markings to influence driver behaviour (e.g. removing centre lines, drawing images on the road)

[27] http://content.tfl.gov.uk/vision-zero-action-plan.pdf
[28] https://www.trafficchoices.co.uk/traffic-schemes/diy-streets.shtml

An evaluation of the DIY Streets programme found that these measures create an all-age friendly environment for residents (Ward Thompson et al., 2014).

This is the approach also promoted by Living Streets, as shown in their video on transforming the local streets in Waltham Forest,[29] and communicated with the message "On residential streets cars are guests" (Tapp and Davis, 2019 p.30).

Bristol City Council developed a stakeholder engagement process which resulted in a palette of interventions to support the implementation of 20mph limits. The aim of this was to ensure that any future investment in local streets would be designed and implemented to enhance the 20mph environment rather than risk undermining it. A similar process to agree a palette of engineering-led solutions could be developed to support national 20mph guidance in Wales.

Promotion

This section is focused on the effectiveness of specific interventions, initiatives or messages as evidenced in the literature.

Social influencing

As described in the earlier sections on what influences driver behaviour, social norms can have a very powerful effect on drivers' speed choice. A number of research studies have tested the use of social media to influence drivers, but most of this work has been in the area of anti-texting (Chen and Alhabsh, 2017; Cismaru and Nimegeers, 2017) or drink-driving (Perkins et al., 2010; Wallen, Warner and Forward, 2016).The over-riding message from these studies is that positive messages, rather than fear appeal, appear to be effective in influencing driver behaviour. This correlates with the types of positive messaging adopted by places such as Calderdale ("We love our Streets") and Bristol ("A little bit slower, a whole lot better") and the positive messaging proposed for the Wales campaign (Tapp and Davis, 2019).

There are a few studies researching anti-speeding messages via social media; for example, Apatu et al.'s (2013) study which investigated the way that Facebook is used amongst groups to share peer-to-peer driving safety messages related to mobile phone use, speeding, and drink-driving. They found that these messages were being shared and were apparently influencing behaviour in the young and old but not the middle aged.

[29] https://www.youtube.com/watch?v=2k8QXPNFQ-Q&feature=youtu.be

Cathcart and Glendon (2015) found that anti-speeding messages targeted at young males were more effective if they contained a combination of threat-appraisal and coping-appraisal which implies different messages should be devised to reach this specific target group. This finding is supported by another study which found that among college students, medium-intensity fear-appeal messages were more effective than higher or lower intensity messages in their effects on intentions to drive fast in the future (Rhodes, 2017). Similarly, two studies by Lewis et al. (2008; 2010) found the use of positive messages to address emotion-based speeding to be inconclusive and needing further research. Finally, in two studies, a complex picture was found for anti-speeding messages (Glendon and Walker, 2013; Glendon and Prendergast, 2019). In the earlier study opposite effects were detected in men and women in relation to anti-speeding message, and the later study found conflicting evidence on the use of fear-appeals and concluded that more research and testing is needed.

The implications for the design of the Wales interventions are that use of messages (positive and negative) and channels (traditional and digital) need to be widely tested and with a range of focus groups to evaluate their potential reach and effectiveness for different target audiences.

Speed awareness courses

The extensive research and practical work conducted by a road safety psychologist concluded that speed awareness courses are only effective as part of a wider package of measures.[30]

In their 20mph research, Atkins noted that an evaluation of the National Speed Awareness Course (NSAC)[31] indicated that participation in the course was more effective at reducing speed reoffending than a Fixed Penalty Notice (comprising a fine and penalty points) over a period of three years following the initial offer to attend. This result was obtained using a variety of analytical approaches giving greater confidence that differences in reoffending rates are due to participation in the course rather than other factors (such as differences in the attitudes or characteristics of those who do and do not take the course).

In Wales, the police do refer some speeding offenders to speed awareness training or driver retraining courses; a total of 910 drivers were referred in 2018.[32] There may be a strong case for delivering a course for 20mph compliance and ensuring there is the resource to deliver it

[30] https://bura.brunel.ac.uk/bitstream/2438/11088/1/Presentation.pdf

[31] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/706208/national-speed-awareness-course-evaluation.pdf

[32] https://statswales.gov.wales/Catalogue/Transport/Roads/motoring-offenders/Fixed-Penalty-Notices/fpnsissuedinwales-by-policeforcearea-outcome-year

for the first three years of the new default limit. A 20mph speed awareness course was developed and run by the National Driver Offender Retraining Scheme but was discontinued and absorbed into the standard National Speed Awareness Course in 2018.[33]

In-car apps

An area of emerging use is in-car apps to send drivers messages whilst driving. Research in this area is focused on using these apps to discourage texting (Chen and Alhabsh, 2017; Cismaru and Nimegeers, 2017) and drink-driving (Perkins et al., 2010; Wallen, Warner and Forward, 2016).

The most encouraging in-car technology to discourage speeding is the use of Intelligent Speed Adaptation (ISA) which is essentially an in-car app that can be used to restrict the car's speed and/or provide the driver with real-time feedback on their speed. This is discussed further in the next section on future technology.

Future Technology

Intelligent Speed Adaptation

As mentioned earlier, EU legislation is due to require ISA to be installed in all new cars by 2022. The system will be over-rideable by drivers so will not limit speeds by default. However, consideration is being given to using haptic feedback through pedals to make it obvious to the driver when they choose to override. This presents the opportunity to give the message to drivers that 'your car knows the speed limit, why not just trust it?'.

There is already a large body of evidence into the effect of ISA as the technology has been available, though evolving, for many years. Research into the current generation of ISA remains inconclusive as to whether drivers will voluntarily use the ISA to limit their speeds, even when incentivised by reductions in their insurance premiums (Starkey, 2020; Wallen, Warner and Forward, 2008; Jamson, 2006; Lahrmann, 2012; Stigson, 2014). If enough drivers – say 10% – do not choose to override their ISA this could have a significant 'pace car' effect on the flow of traffic and lead to high overall levels of compliance with 20mph (Tapp and Davis, 2019). There would be scope to encourage the uptake of ISA with large public and/or private sector employers in Wales to achieve a rapid scaling effect. This remains, therefore, an area for further research and testing as the introduction of the technology reaches the mainstream.

[33] https://www.ndors.org.uk/scheme/trends-statistics/

Speed cameras

Road safety partnerships were given approval to use type-approved speed cameras from 1 April 2007 although the DfT at that time did not encourage their use to enforce a 20mph limit,[34] preferring self-enforcement or traffic calming measures.

Other technology such as Automatic Number Plate Recognition (ANPR) that is used by the police and local authorities in many cities has the power to identify urban speeders but is not routinely used to do so (whether due to lack of resource or practical cost or ethical constraints may be debated). Average speed cameras, known as SPECS are also reportedly available on the market but are not yet being deployed by cities – cost is likely to be a limiting factor (Tapp and Davis 2019). Transport for London confirmed that they recalibrated all of their safety speed cameras to 20mph to support the city-wide roll out of the new limits which went live on 2 March 2020.[35]

[34] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/465165/dft-circular-0107.pdf
[35] https://tfl.gov.uk/info-for/media/press-releases/2020/february/road-danger-reduced-with-new-20mph-speed-limits-on-all-tfl-roads-in-central-london

Designing a mix of interventions for Wales

This section draws on the evidence presented in the previous sections to propose an outline approach to achieving driver compliance with the 20mph limit. The development of the behavioural change programme will evolve over time as more data are gathered (e.g. from the Omnibus) and delivery partners discuss the detail and allocate budgets. The proposals below are therefore idealistic but should provide a useful starting point for discussion amongst key stakeholders and delivery partners.

The proposals are structured as follows:

- which **drivers** are least, and most, likely to comply (to inform promotion and enforcement priorities);
- **locations** where drivers are least, and most likely to comply (to inform enforcement and engineering priorities); and
- the role of different **stakeholders** in delivering the interventions (to ensure that an integrated mix of enforcement, engineering and promotion solutions are deployed).

Drivers

It is suggested that there are three broad categories of driver in relation to 20mph compliance: defiers, conformers and champions. As their labels imply, they have widely differing attitudes and behaviours towards the 20mph limits, and interventions need to be tailored to have an impact on all three groups. A suggested approach is described in Box 9.

Box 9: Tailored approach to driver compliance

	Defiers	Conformers	Champions
Traits	Young, male, high mileage commuter, delivery drivers	Taxi and bus drivers, urbanites, women	People with young children, cyclists, environmentalists
Attitude to 20mph	Hate it	Accept it	Love it
Behaviour in 20mph	Refuse to stick to it	Try to stick to it	Always stick to it
Interventions to maximise group compliance	Clear signage, police enforcement, social shaming, mixed messages with positive and fear appeal	Vehicle Activated Signs, positive messages, peer to peer influencing, engineering, speed awareness courses	Pace car effect, Community Speedwatch volunteers, peer to peer influencing, DIY Streets initiators

The interventions to get compliance from defiers will need to be focused on enforcement to force them to comply as far as possible whilst the conformers need a mix of encouragement and support to remind them of their new behaviour. Any positive impact on the driving behaviour of champions and conformers will have a pace car effect on defiers, reducing their ability to speed. The champions should be regarded as an asset to promote and self-enforce 20mph across their local communities. It could be argued that the conformers, who represent the majority of the population and are ready to change their behaviours, should be given the most attention and therefore the interventions in red be allocated the most resources. This is the approach that Transport for London have taken, targeting the 'average' driver with positive messages about 20mph limits.

Locations

Some locations will be more likely than others to attract high levels of non-compliance. These will include:

- Areas where a high proportion of 'defier' driver types live or work (e.g. areas with high proportions of out-commuters, industrial estates, out-of-town office locations)
- Roads which have visual cues that encourage faster speeds (e.g. long, straight or wide roads with few obstructions such as trees or parked cars)
- Villages sited on main trunk roads with derestricted limits at either end
- Main roads in urban and suburban areas

The national road network (i.e. A-roads, trunk roads), which tend to prioritise traffic flow over people movement, have been found to be a particular challenge in encouraging 20mph adherence, and will need a dedicated strategy with stakeholder buy-in and resources to achieve compliance.

The Welsh police forces will have much data that can help identify these problem locations; for example, they will know the sites where killed and seriously injured collisions have occurred, where repeat speeding offenders live, and which communities are regularly requesting additional enforcement – whilst being mindful of issues relating to under-reporting of particular casualty types. The police will be able to work with local authorities to carry out a risk assessment to identify hotspots where enforcement and/or engineering will be required to get compliance.

Stakeholders

The evidence shows that the most successful, large-scale 20mph initiatives are the ones that have been supported by a strong, multi-sector partnership approach. The funding and human resources needed to achieve long-term behaviour change are significant and there will need to be long-term commitment from a wide range of local and national stakeholders across Wales. The roles of key stakeholders are suggested in Box 10. There will of course be many other stakeholders to successfully deliver a compliance programme, but these are ones that have been identified as part of this evidence review.

Box 10: Stakeholder roles and responsibilities

Stakeholder	Role	Responsibilities
Welsh Government	Lead promoter	National policy context, programme management, funding, national communication
Local Authorities	Delivery	Local policy, road safety and highways engineering, signage, public communication, match funding
GoSafe	Enforcement	Allocating resources, targeted enforcement, public communication, data
Welsh Police	Enforcement	Allocating resources, targeted enforcement, public communication, data
Welsh Fire Service	Delivery	Public communication and education
Public Health	Advisory	Public communication, health data
NHS and Health Boards[36]	Advisory	Public communication, advocacy
Academics	Advisory	Evidence, message design, evaluation
Public Transport Operators	Champions	Driver training, public communication
Schools	Champions	Advocacy, communicating with parents, speed watch
Employers	Champions	Advocacy, fleet management
Campaign Groups	Champions	Advocacy, public communication, direct action
Accessibility and Inclusion Groups	Champions	Advocacy, public communication, direct action
Driving Instructors	Champions	Driver training
Communities	Champions	Community action, peer-to-to peer influencing

[36] In the West Midlands, Children's Hospitals were active champions

Taking a systems approach

As already set out at the start of the section on ‘what works?’ it is clear from the evidence that an integrated approach, which deploys enforcement, engineering and promotion in parallel, is essential in achieving compliance. This was a point that was emphasised and reiterated by the expert contributors at the roundtable event.

These experts went a step further by advocating that a ‘whole systems approach’ should be taken so that all the many elements that contribute to achieving (or indeed hinder) compliance are taken into consideration and addressed in a comprehensive plan.

An advantage of regarding 20mph limit as part of a wider system is that it can encourage policy makers and practitioners to work together to get compliance and deliver a range of positive outcomes including fewer injuries, lower carbon emissions, better air quality and more active travel. This wider policy context fits with the Welsh Government’s Well-being of Future Generations Act (2015) as well as the Active Travel (Wales) Act (2013) and should help to gain traction and secure additional resources from diverse stakeholders.

Monitoring and evaluation

The introduction of a national default 20mph limit for Wales will require a culture shift over time and it will be important to monitor the changes over an extended period of time – ten years perhaps – to measure impact. The Omnibus survey data being collected in 2020 provides an important pre-intervention baseline. There is a great opportunity to showcase Wales as a national first in achieving a culture shift towards 20mph but this will need longitudinal data to measure the change in attitudes and behaviours year on year.

Conclusions

The introduction of a national default of 20mph in residential areas is a bold and exciting step by the Welsh Government that will, if complied with, improve the quality of life of people living in Wales. This review has drawn a number of conclusions from published research as well as experience from practitioners who have already implemented 20mph limits. These conclusions are summarised below:

- The majority of drivers say that they support the idea of 20mph limits, but actual compliance has been found to be low. A journey speed analysis of 20mph limits found that the median speed fell by only 0.7mph in residential areas and 0.9mph in city centre areas (Atkins et al, 2018).
- To change drivers' habits and build a 20mph culture across Wales a target of a 5-8mph drop, for example, in average speeds over five years and a comprehensive programme of behaviour change interventions will be needed.
- Drivers can be broadly segmented into three categories – defiers, conformers and champions – with most drivers being law abiding citizens belonging to the conformers group. The behaviour change programme should focus its resources on helping the majority to comply to achieve a tipping point where most would be driving slower and therefore pacing other drivers.
- Lessons on what works can be learned from other sectors. For example, targeting new behaviours (learner drivers) before habits become engrained and providing information as part a wider package of measures to increase its effectiveness.
- An integrated package of measures will need to include a balanced mix of enforcement, engineering and promotion interventions in order to maximise impact across all geographies and demographics. Exact details will need to be based on further data collection, piloting and assessing the effectiveness of the pilots.
- Police enforcement has been found to be a vital component of success in all 20mph limits. Strategic leadership, for example from the Police and Crime Commissioners in Wales, will be particularly important to set the tone and direction and secure adequate resources to deploy agile policing. Community enforcement such as Community Speed Watch or Junior RoadWatch can play a useful role but needs police support.

- Typical, post-1935 built urban roads are designed for a 30mph speed limit and do not send out the right visual cues for drivers to comply with a 20mph limit. Some roads (particularly main roads) will need to be re-engineered and a risk-based assessment carried out to prioritise resources. Low cost, community-led changes to street layout can also be effective such as re-arranging parking and positioning on-street planters, bin stores and cycle racks.
- Positive messages are most effective in promoting 20mph amongst mainstream drivers but some groups, such as young males, may respond more to different types of messaging, for example fear or skills-based messages. Peer-to-peer influencing is important as drivers are most strongly influenced by other similar drivers. Also, speed awareness courses and in-car apps have an important role to play in raising awareness and encouraging compliance.
- Future technology offers the potential to increase compliance with the introduction of Intelligent Speed Adaptation (ISA) on all new cars by 2022 but benefits will not be automatic as drivers will be able to over-ride it. A campaign to get fleet managers and professional drivers to adhere to ISA could result in a pace car effect slowing down overall traffic speeds.
- The design of the behaviour change programme for Wales will need to be tailored to specific driver groups and locations according to baseline data. It is suggested that substantial resources should be directed towards supporting and encouraging the 'average' driver with a combination of prompts (for example Vehicle Activated Signs), encouragement (for example positive messages and community/peer-to-peer influencing) and penalties (for example pop-up enforcement and speed awareness courses).
- A multi-stakeholder plan that secures support and financial resources from a wide range of local and national Welsh stakeholders will be needed to deliver a comprehensive package of measures sustained over at least five years.
- Data on speed should be collected over at least a five-year period (from a 2020 baseline) to be able to showcase Wales as a first in achieving a national culture shift towards 20mph.

References

Aberg, L., Larsen, L., Glad, A. and Beilinsson, L. (1997). **Observed Vehicle Speed and Drivers' Perceived Speed of Others,** Applied Psychology, 46(3), 287-302.

Association of Chief Police Officers (ACPO) (2013). **ACPO Speed Enforcement Policy Guidelines 2011-2015.** Joining forces for safer roads. Technical report.

Ahie, L. M., Charlton, S. G. and Starkey, N. J. (2015). **The role of preference in speed choice**. Transportation Research Part F: Traffic Psychology and Behaviour, 30, 66-73.

Anable, J. (2005). **'Complacent Car Addicts' or 'Aspiring Environmentalists'? Identifying travel behaviour segments using attitude theory**. Transport Policy, 12, 65-78.

Anciaes, P.R. (2018) **Value reduction in community severance**. Transport Policy, 64, 10-11.

Apatu, E. J. I., Alperin, M., Miner, K. R. and Wiljer, D. (2013). **A Drive Through Web 2.0: An Exploration of Driving Safety Promotion on Facebook**. Health Promotion Practice, 14(1), 88-95.

Arnott, B., Rehackova, L., Errington, L., Sniehotta, F., Roberts, J. and Araujo-Soares, V. (2013). **Efficacy of behavioural interventions for transport behaviour change: systematic review, meta-analysis and intervention coding**. International Journal of Behavioral Nutrition and Physical Activity, 11, 133.

Atkins, AECOM and Maher, M. (2018). **20mph Research Report. Process and Impact Evaluation Headline Report**. London: Department for Transport.

Azjen, I. (1991). **The theory of planned behaviour**. Organizational Behavior and Human Decision Processes, 50, 170-211.

Brewster, S. E., Elliott, M. A. and Kelly, S. W. (2015). **Evidence that implementation intentions reduce drivers' speeding behavior: testing a new intervention to change driver behaviour**. Accident analysis and prevention, 74, 229-42.

The Centre for Climate Change and Social Transformations (2019). **Engaging the public on low-carbon lifestyle change**. CAST Briefing Paper 01.

Carmona, M. (2017). **Street Appeal**, UCL, Volume 126, November 2018, Pages 1-51.

Cathcart, R. L. and Glendon, I. A. (2015). **Judged effectiveness of threat and coping appraisal anti-speeding messages.** Accident Analysis and Prevention, 96, 237-248.

Charlton, S. (2017). **Drivers' mental representations of familiar rural roads**, Journal of Environmental Psychology, 50, 1-8.

Chen, L. and Alhabash, S. (2017). **Understanding Non-Profit and For-Profit Social Marketing on Social Media: The Case of Anti-Texting While Driving**. Journal of Promotion Management, 24(4), 484-510.

Chevalier, A., Coxon, K., Rogers, K., Chevalier, A. J., Wall, J., Brown, J., Clarke, E., Ivers, R. and Keay, L. (2016). **A longitudinal investigation of the predictors of older drivers' speeding behaviour**. Accident; analysis and prevention, 93, 41-47.

Cismaru, M. and Nimegeers, K. (2017) **"Keep your eyes up, don't text and drive": a review of anti-texting while driving Campaigns' recommendations**. International Review on Public and Non-Profit Marketing, 14(1), 113-135.

Coogan, M. A., Campbell, M., Adler, T. J. and Forward, S. (2014). **Examining behavioral and attitudinal differences among groups in their traffic safety culture**. Transportation Research Part F, 26, 303-316.

Corbett, C. (2000). **A typology of drivers' responses to speed cameras: Implications for speed limit enforcement and road safety**. Psychology, Crime & Law, 6(4), 305-330.

Cribb, J. and Emmerson, C. (2016). **What happens when employers are obliged to nudge? Automatic enrolment and pension saving in the UK**. IFS Working Papers, No. W16/19, Institute for Fiscal Studies (IFS), London.

Department for Transport (1999). **20mph limits and zones**. Traffic Advisory Leaflet 9/99, DfT June 1999.

Department for Transport (2007). **Use of speed and red-light cameras for enforcement: guidance on deployment, visibility and signing**. DfT Circular 01/2007.

Department for Transport (2013). **Setting Local Speed Limits**. DfT Circular 01/2013.

Department for Transport (2016). **Traffic Signs Regulations and General Directions**. DfT Circular 01/2016.

Department for Transport (2019). **Accident and casualty costs (RAS60).**

Dixon, M. R., Loukus, A. K., Bogdanovich, T., Marlett, K., Stocks R. and Westlake, S. (2014). **Naturalistic Experimental Analysis of Driver Compliance With Posted Speed Limits**. Journal of Organizational Behavior Management, 34(3), 196-206.

Edinburgh City Council (2013). **South Central Edinburgh 20mph Limit Pilot Evaluation**. Transport and Environment Committee, 27th August 2013.

Elliott, M. A., Mccartan, R., Brewster, S. E., Coyle, D., Emerson, L. and Gibson, K. (2017). **An application of the prototype willingness model to drivers' speeding behaviour.** European Journal of Social Psychology, 47(6), 735-747.

Fleiter, J. L., Lennon, A. and Watson, B. (2010). **How do other people influence your driving speed? Exploring the 'who' and the 'how' of social influences on speeding from a qualitative perspective**. Transportation Research Part F, 13, 49-62.

Fointiat, V. (2004). **I know what I have to do, but... when hypocrisy leads to behavioral change**. Social behavior and personality, 32(8), 741-746.

Forward, S. (2006). **The intention to commit driving violations – A qualitative study**. Transportation Research Part F, 9, 412-426.

Fylan, F. (2017). **Using Behaviour Change Techniques: Guidance for the road safety community**. RAC Foundation.

Garrod, G. (2002). **Estimating the benefits of traffic calming**. Journal of Transport Economics and Policy, 36(2), 211-231.

Glendon, I. and Walker, B. L. (2013). **Can anti-speeding messages based on protection motivation theory influence reported speeding intentions?** Accident Analysis & Prevention, 57, 67-79.

Glendon, A. I. and Prendergast, S. (2019). **Rank-ordering anti-speeding messages**. Accident; analysis and prevention, 132, 105254.

Goralzik, A. and Vollrath, M. (2017). **The effects of road, driver, and passenger presence on drivers' choice of speed: a driving simulator study**. Transportation Research Procedia, 25, 2061-2075.

Haringey Council (2013) **Sustainable Transport Report – A 20mph speed limit in Haringey?**

Hydén, C. (2020). **Speed in a high-speed society**. International Journal of Injury Control and Safety Promotion, 27(1), 44-50.

Jamson, S. (2006). **Would those who need ISA, use it? Investigating the relationship between drivers' speed choice and their use of a voluntary ISA system**. Transportation Research Part F: Psychology and Behaviour, 9(3), 195-20.

Jones, S.J. and Brunt, H. (2017). **Twenty miles per hour speed limits: a sustainable solution to public health problems in Wales**. Journal of Epidemiology and Community Health, 71(7), 699-706.

Kahneman, D. and Tversky, A. (1979). **Prospect Theory: An analysis of decision under risk**. Econometrica, 47(2), 263–291.

Kahneman, D. (2012). **Thinking fast and slow**. London: Penguin Books.

Lahrmann, H., Agerholm, N., Tradisauskas, N., Berthelsen, K. K. and Harms, L. (2012). **Pay as You Speed, ISA with incentive for not speeding: Results and interpretation of speed data**. Accident Analysis and Prevention, 48, 17-28.

Lee, Y.M., Chong, S.Y., Goonting, K. and Sheppard, E. (2017). **The effect of speed limit credibility on drivers' speed choice**. Transportation Research Part F: Psychology and Behaviour, 45, 43-53.

Lewis, I., Watson, B. and White, K. M. (2008). **An examination of message-relevant affect in road safety messages: Should road safety advertisements aim to make us feel good or bad?** Transportation Research Part F, 11, 403-417.

Lewis, I. M., Watson, B. and White, K.M. (2010). **Response efficacy: The key to minimizing rejection and maximizing acceptance of emotion-based anti-speeding messages**. Accident Analysis and Prevention, 42, 459-467.

Lheureux, F. and Auzoult, L. (2016). **When the social discourse on violation behaviours is challenged by the perception of everyday life experiences: Effects of non-accident experiences on offending attitudes and habits**. Accident; analysis and prevention, 94, 89-96.

Loewenstein, G. and Prelec, D. (1992). **Anomalies in Intertemporal Choice: Evidence and interpretation**. Quarterly Journal of Economics, 107(2), 573-59.

Lydon, M. and Garcia, A. (2015). **Inspirations and Antecedents of Tactical Urbanism, Inspirations and Antecedents of Tactical Urbanism**. In: Tactical Urbanism. Island Press, Washington, DC.

Maroney, S. and Dewar, R. (1987). **Alternatives to enforcement in modifying the speeding behavior of drivers**. Transportation Research Record No. 1111, Traffic Accident Analysis, Visibility Factors, and Motorist Information Needs., pp.121-126.

McKenna, F. P. (1993). **It won't happen to me: Unrealistic optimism or illusion of control?** British Journal of Psychology, 84(1), 39-50.

Musselwhite, C., Avineri, E., Susilo, Y., Fulcher, E., Bhattachary, D., Hunter, A. and Stockley, R. (2010). **Understanding Public Attitudes to Road User Safety.** Road Safety Research Report No. 111, Department for Transport, September 2010.

NICE (2009). **Systematic reviews of effectiveness and cost-effectiveness of road and street design-based interventions aimed at reducing unintentional injuries in children**

Nolan, J., Schultz, W., Cialdini, R., Goldstein, N. and Griskevicius, V. (2008). **Normative social influence is under-detected**. Personality and Social Psychology Bulletin, 34, 913-924.

Perkins, W. H., Linkenbach, J. W., Lewis, M. A. and Neighbors, C. (2010). **Effectiveness of social norms media marketing in reducing drinking and driving: A statewide campaign**. Addictive Behaviors 35, 866-874.

Poulter, D. and McKenna, F. (2007). **Is speeding a "real" antisocial behavior? A comparison with other antisocial behaviors.** Accident Analysis and Prevention, 39, 384-389.

Rhodes, N. (2017). **Fear-Appeal Messages: Message Processing and Affective Attitudes**. Communication Research, 44(7), 952-975.

ROSPA (2017). **20mph Zones and Speed Limits Factsheet**. Birmingham: Royal Society of Prevention of Accidents.

Sanders, M., Snijders, V. and Hallworth, M. (2018). **Behavioural science and policy: where are we now and where are we going?** Behavioural Public Policy 2(2), 144-167.

Smith, E. R. and Collins, E. C. (2009). **Dual-process models: A social psychological perspective**, Chapter 9, In Keith Frankish & Jonathan St B. T. Evans (eds.), In Two Minds: Dual Processes and Beyond. Oxford University Press. pp. 197-216.

Starkey, N. (2020). **Drivers' response to speed warnings provided by a smart phone app**. Transportation Research Part C: Emerging Technologies, Volume 110, 209-221.

Stigson, H., Hagberg, J., Kullgren, A. and Krafft, M. (2014). **A One Year Pay-as-You-Speed Trial With Economic Incentives for Not Speeding**. Traffic Injury Prevention, 15, 612-618.

Stradling, S. G., Campbell, M., Allan, I. A., Gorell, R. S. Hill, J. S. and Winter, M G. (2003). **The Speeding Driver: Who, How and Why**? Scottish Executive Social Research, 2003.

Stradling, S. G. (2007). **Car driver speed choice in Scotland**, Ergonomics, 50(8), 1196-1208.

Svenson, O. (1981). **Are we all less risky and more skilful than our fellow drivers?** Acta Psychologica, 47(2), 143-148.

SWOV (2018). **SWOV Fact Sheet, Zones 30: Urban Residential Areas**. Updated May 2018.

Tapp, A., Nancarrow, C. and Davis, A. (2015). **Support and compliance with 20 mph speed limits in Great Britain**. Transportation Research Part F – Traffic Psychology and Behaviour, 31, 36-53.

Tapp, A., Nancarrow, C., Davis, A. and Jones, S. (2016). **Vicious or virtuous circles? Exploring the vulnerability of drivers to break low urban speed limits**. Transportation Research Part A – Policy and Practice, 91, 195-212.

Tapp, A. and Davis, A. (2019). **Communications Strategies to Encourage Support and Compliance with 20mph Limits in Wales.** Background paper prepared for Welsh Government, December 2019. Unpublished.

Thaler, R.H. and Sunnstein, C.R. (2008). **Nudge: Improving decisions about health, wealth, and happiness.** Yale University Press, New Haven, CT, 2008.

Thomas, G.O., Poortinga, W. and Sautkina, E. (2016). **The Welsh Single-Use Carrier Bag Charge and behavioural spillover.** Journal of Environmental Psychology, 47, 126-135.

Toy, S., Tapp, A., Musslewhite, C. and Davis, A. (2014). **Can social marketing make 20mph the new social norm**? Journal of Transport and Health, Journal of Transport & Health, 1, 165-173.

Transport Scotland (2013). **Prolific illegal driving behaviour: A qualitative study**. Transport Scotland.

Turner, K. (2018). **Programme theory for understanding how twenty mile per hour speed limits impact health**. Journal of Transport and Health, 10, 92-110.

Wall, J., Cuenca, V., Creef, K. and Barnes, B. (2013). **Attitudes and Opinions towards Intelligent Speed Adaptation**. 2013 IEEE Intelligent Vehicles Symposium Workshops (IV Workshops), Gold Coast, Australia.

Wallen W. H. and Aberg, L. (2008). **Drivers' beliefs about exceeding the speed limit**. Transportation Research Part F, 11, 376-389.

Wallen W. H. and Forward, S. (2016). **The effectiveness of road safety interventions using three different messages: Emotional, factual or a combination of both messages**. Transportation Research Part F: Psychology and Behaviour, 36, 25-34.

Ward Thompson, C., Curl, A., Aspinall, P., Alves, S. and Zuin, A. (2014). **Do changes to the local street environment alter behaviour and quality of life of older adults? The 'DIY Streets' intervention**. British Journal of Sports Medicine, 48, 1059-1065.

Warner, H. W. and Åberg, L. (2008). **The long-term effects of an ISA speed-warning device on drivers' speeding behaviour**. Transportation Research Part F: Traffic Psychology and Behaviour, 11(2), 96-107.

Webster, D.C. and Wells, P.A. (2010). **The characteristics of speeders**. TRL Report 440, Transport Research Laboratory 2010.

Wells, H. and Wills, D. (2012). **Individualism and Identity: Resistance to Speed Cameras in the UK**. Surveillance and Society 6(3).

Wells, H. (2019). **Scrutinising the appeal of volunteer Community Speedwatch**. Policing and Society, 29(4), 376-391.

Welsh Government (2013). **Design Guidance Active Travel (Wales) Act 2013**.

Welsh Assembly Government (2009). **Setting Local Speed Limits in Wales**. Welsh Assembly Government Circular No: 24/2009.

WHO (2017). **Managing Speed**. WHO/NMH/NVI/17.7.

Winnett, M.A. and Wheeler, A.H. (1991). **Vehicle-activated signs – a large scale evaluation**. Transport Research Laboratory, Report 548.

Yao, Y., Carsten, O., Hibberd, D. and Li, P. (2019). **Exploring the relationship between risk perception, speed limit credibility and speed limit compliance**. Transportation Research Part F, 62, 575–586.

Annex 1

Methodology and limitations

Literature review

The literature search was conducted using three Cardiff Library on-line, advanced search facilities, supplemented by use of Google Scholar, using the following key words:

- Speed
- Speed limit (rural and urban)
- Speed choice
- Enforcement
- Compliance
- Driver behaviour
- Driver psychology
- Driver typology
- Attitude
- Intention
- Behaviour change
- 20 mph
- Social influence

In addition, extensive internet searches were carried out to identify emerging practices, use of new technology, best practice from local authorities and news articles or opinion pieces to gauge alternative perspectives.

Expert input

A number of expert academics and practitioners kindly offered insights or agreed to be interviewed on the telephone to contribute to the writing of this report. Thanks go to:

- Dr Neale Kinnear, Head of Behaviour Change, Transport Research Laboratory
- Tim Hogg, Senior Consultant, Oxera Consulting
- Dr Ian Walker, Lecturer in Psychology, University of Bath
- Sylvia Chenery, Managing Associate, Applied Criminology Associates
- PC Mark Hodson, West Midlands Police Road Harm Reduction Team

This report has been written to complement the work undertaken by Professor Alan Tapp and Professor Adrian Davis on the Communication Strategy and a telephone conference was held between them and the author.

A remote roundtable was held in April 2020 to gather insights, inputs and comments from a range of experts. This helped to inform the section on designing a mixed intervention for Wales.

Gaps and limitations

Nearly all of the published literature on speeding is focused on faster roads e.g. 50/60/70mph limits (where crashes are more dangerous). There is much less peer-reviewed literature on the issues around urban or residential speeding in 20 or even 30mph limits; this perhaps points to the fact that low level speeding is socially acceptable and is not a high priority for funded academic research.

Most of the literature on risky driving/speeding is focused on young males but other groups (young women, high mileage commuters) are likely to be regularly speeding too and should not be neglected despite the lack of research.

Most of the studies on speeding rely on self-reporting, so drivers *saying* they are willing to drive at 30 or 20mph where people live need to be treated with caution. There is little observational or naturalistic evidence on actual speed choice compared to self-reported speeds.

There is little evidence on the difference between driving attitudes and behaviours in urban and rural residential areas. The Omnibus survey will be able to provide new data on this.

Speeding near schools is deemed socially unacceptable – but only when children are there and only on that section of road. This may result in marginalising 20mph to only being acceptable where children are present (e.g. in the 2019 Haringey study, people suggested that 20mph was only necessary when children were going to or leaving school). We know that some demographics are typically more supportive of 20mph than others (Tapp et al., 2015) but there is a lack of Wales-specific knowledge around this. This will be provided by the Omnibus survey.

Annex 2

Attitudes to, and psychology of, speeding

The speeding research, as mentioned above, has a strong focus on higher speed limits and there is much less published research on attitudes or behaviour in relation to the current UK-wide default of 30mph, let alone 20mph limits which were only legislated for in the UK in 1999.[37] However, there are a number of useful studies that throw some light on drivers' attitudes to residential speed limits including Aberg et al., 1997; Poulter and McKenna, 2007; Stradling, 2007; Tapp et al., 2016; Transport Scotland, 2013; and Wallen, Warner and Forward, 2016. For example, a study by Atkins et al. (2018) found high levels of support for 20mph limits in England:

> *The most up to date study of 20mph (signs-only) limits in England, commissioned by the DfT in 2014, found high levels of post implementation support amongst cyclists (81%), residents (75%), and non-resident drivers (66%) and little call for the limit to be changed back to 30mph (12% support amongst residents and 21% amongst non-resident drivers)*
>
> Atkins et al. (2018)

Qualitative research conducted by Transport Scotland (2013) found that drivers self-reported 20 and 30mph areas as the areas they were least likely to speed; this attitude was found to apply regardless of age and gender. Research based on the British Crime Survey found that speeding traffic was perceived as the greatest of 16 antisocial problems in local communities, regardless of whether respondents were male or female, young, middle aged, or old (Poulter and McKenna, 2007). The respondents in this this survey did support enforcement on 30mph residential roads and indicated that traveling at 35mph on a 30mph residential road was not acceptable. However, as both these studies rely on self-reporting it is not possible to know whether these drivers matched their behaviour to their stated attitude – as Poulter and McKenna noted:

[37] https://www.rospa.com/rospaweb/docs/advice-services/road-safety/drivers/20-mph-zone-factsheet.pdf

"…it is entirely possible that peoples' concern about speeding reflects what they feel they ought to do rather than what they actually do."

Researchers in Sweden found that drivers think that people living 'along the streets and roads' do not want them to exceed the speed limits (Wallen, Warner and Aberg, 2008). This is in accordance with previous research including nearly 500 Danish and Swedish drivers of whom 87% reported having great or moderate concern for vulnerable road users compared to 64% who reported having great or moderate concern for other drivers in choosing their speed (Aberg et al., 1997). However, this study also concluded that:

> **"…although a majority of the subjects drove faster than the speed limit, most of the drivers believed that vulnerable persons accepted their speed choice; relatively few drivers thought that vulnerable persons considered their speed as too high. Thus, the pressure from vulnerable road-users did not appear to be very strong."** (Aberg et al., 1997)

A population-wide survey of GB drivers was carried out in 2015 by Tapp et al. to explore how support and compliance were interlinked. The research revealed a complex relationship: whilst as expected many supporters said they would comply with the limits, and many opponents might not comply, it was also found that some supporters claimed not to comply, while some opponents of 20mph limits were conformers.

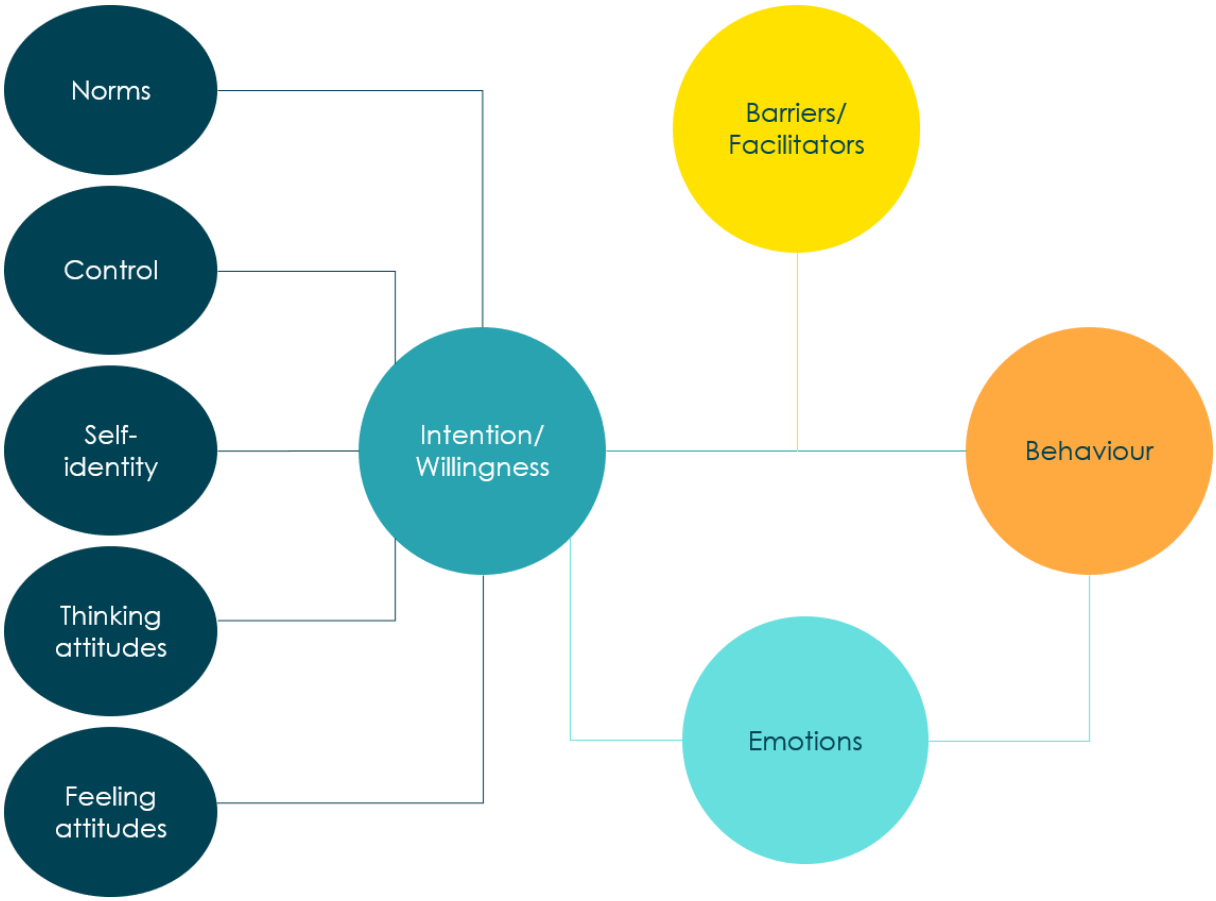
In summary, whilst most people *say* they support low speed limits in residential areas, there is a strong body of evidence to show that people's *actual driving* behaviour in relation to speed choice does not always correspond to their stated attitudes and beliefs. This is known by psychologists as the intention-behaviour gap.

The psychology of driving behaviour is complex and has been extensively researched over many years. Speeding is the result of a combination of values, beliefs, social norms and externalities. The most commonly applied theory to help understand why drivers speed is the Theory of Planned Behaviour (TPB, Azjen, 1991) though it is generally accepted that no one single model can fully explain driver psychology and behaviour:

"..the selection of one behaviour change theory would not fully account for all the factors that would influence why behaviour change might occur in this instance [20mph limit]." Turner, 2018

Last year the RAC commissioned the production of behaviour change guidance for the road safety community (Fylan, 2019). This guidance uses an updated version of TPB to include elements of other behaviour change theories such as the Dual-Process Approach (Smith and Collins, 2009) and the Prototype Willingness Model (Elliott et al., 2017). This hybrid model, developed specifically for road safety specialists to use, is summarised in a simple illustration (see Figure 1).

Figure 1: Psychological model of behaviour



Source: Using Behaviour Change Techniques: Guidance for the road safety community, The RAC Foundation, Fiona Fylan, 2017

The model identifies the following individual influences on intention to speed:

- beliefs about what other people do (norms);
- control that they feel they have over their behaviour;
- how their behaviour fits with their self-identity; and
- their emotions.

The model also includes external factors – barriers and facilitators – that affect an individual's behaviour and may influence the relationship between intention and actual behaviour. For example, on seeing a police car parked in a layby ahead most drivers will choose to slow down, thus breaking their intention to speed (Dixon et al., 2014). This is a good example of the behaviour-intention gap and is a key mechanism to be used in changing driver behaviour in relation to speed choice.

Norms (descriptive and injunctive)

Human action is motivated by two types of social norm: descriptive and injunctive (Coogan et al., 2014). Descriptive norms reflect *what is done in practice* whilst injunctive norms reflect what *ought to be done*. In the case of a culture which accepts speeding, the former is the observation that 'other people like me are breaking the speed limit' whilst the latter is the comforting validation that 'other people will not disapprove if I break the speed limit'.

In combination these two types of social norm have a profound effect on people's intention or willingness to speed. Drivers tend to underestimate just how powerfully these normative social influences affect their behaviour and (incorrectly) rate other influences more highly – this leads to speeding as a social norm (Nolan et al., 2008; Haglund and Aberg, 2000; Fleiter et al., 2010; Goralzik and Vollrath, 2017). A number of academics including Corbett (2000), Stradling (2003) and Forward (2006) have asserted that speeding is an everyday activity and that there is a culture of 'speeding acceptability' which cuts across different geographies and demographics and is not easily attributed to specific groups or target segments. This creates a society where exceeding the speed limit is completely socially acceptable (we are all aware of the urban myth that you can get away with being 10% above any speed limit).[38] The police have also been accused of turning a blind eye to 20mph limits and the policing guidelines (ACPO, 2013) place heavy emphasis on the 'look and feel of the road'. This makes it extremely hard for even the most well-intentioned driver to stick to the speed limit.

Reported negative experiences such as those reported by drivers in Haringey (2019) are based on limited anecdotal or qualitative evidence, so it is difficult to assess the scale of the problem more generally in neighbourhoods with 20mph limits.

The issue of social norms and approval is a recurring theme in this report because challenging the acceptability of speeding in residential areas is central to the reason for introducing a *national default* 20mph limit in Wales. Tackling negative attitudes and building

[38] https://www.thesun.co.uk/motors/3497322/driving-fine-speeding-10-per-cent-above-limit/

public support for 20mph in Wales would be a core aspect of a communication strategy (Tapp and Davis, 2019).

Effect of social norms

The widespread social acceptability – the normalisation – of speeding makes it hard for drivers to stick to the speed limit.

The other dimensions of the model set out by Fylan in Figure 1 are outlined below.

Control

All drivers hold beliefs about how well they are able to control their driving behaviour on the roads. The interesting thing that researchers have found is that people consistently over-estimate how skilful they are at driving (Svenson, 1981) and underestimate their chances of being involved in a collision (McKenna, 1993). This over-confidence leads a commonly held view that 'I am a better than average driver' and that the speed limits are for 'other drivers who are more dangerous than me'. It has been shown that the less frequently drivers are involved in collisions the more (false) belief they have in their own sense of control (Lheureux and Laurent, 2016).

Effects of control

Drivers tend to be over-confident in their ability to drive safely and avoid a collision and think that speed limits are really there for the other bad drivers

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Self-identity

A driver's self-identity will influence their attitude to speed limits and speeding. Certain groups of people, as outlined by Stradling in Box 1, self-identify as fast drivers and they will be the ones that are unlikely to comply with speed limits unless they are stringently and regularly enforced (Corbett, 2000). Young male drivers are typically included in this group. However, there is a more problematic dimension to this factor, as explored by Wells and Wills (2012) in their research into the resistance to speed cameras. They concluded that "…the self-ascribed identity of normal, respectable, non-criminal drivers [who speed] is threatened by technologies of risk and 'techno-fixes' which (through their operation) construct identities as risk-carrying, deviant, and criminal." In other words, as speeding is socially

acceptable people who regularly and intentionally break the speed limit self-identify as decent, law abiding citizens.

Effects of self-identity

People who break the speed limit tend to self-identify as respectable, non-criminal drivers who are not putting anyone at risk

Attitudes (thinking and feeling)

Thinking attitudes are the beliefs that drivers have about whether speeding is good or bad. Unfortunately, people can have conflicting beliefs about the same behaviour at the same time – for example someone may think that it does not matter if they break the speed limit whilst also believing that people who break the speed limit are dangerous drivers. This hypocrisy has been explored (Fointiat, 2004) and explicitly in relation to attitudes to 20mph (Toy et al., 2014) where the term JIMBYism (Just In My Back Yard ism) was used to highlight the fact that people do not want drivers to speed on the street where they live but are happy to break the speed limit when driving down other people's streets.

Feeling attitudes are the beliefs people hold about how they will *feel* when they are driving. Some personality types – risk takers – are more likely to seek the thrill of driving fast. This aspect of behaviour is likely to be less applicable to 20mph and 30mph as it could be argued there is little thrill to be gained from driving at slow speed. These types of driver may however be more likely to tailgate, harass or in extreme cases overtake drivers who are sticking to the limit (as described in Box 2).

Effects of attitudes

People may hold two opposing beliefs so they say that they support a 20mph speed limit but do not actually choose to drive at 20mph (except in their own street)

Emotions

The role of emotions has not always been included in speeding-related research as the traditional model of the Theory of Planned Behaviour does not include emotions as a factor. However, there is evidence that anticipated feelings (how you think you will feel after you have performed the behaviour) and experienced feelings (how you will feel during the behaviour) can over-ride behavioural intentions (Fylan, 2017). Examples of this are emotions of regret or anger. In contrast there is anecdotal evidence that driving at 20mph

may feel calmer and less stressful for the driver and passengers but there is no published literature in this area.

Effects of emotions

20mph feels 'too slow' for most drivers at the moment – this can lead to anger and frustration rather than a feel-good factor (such as 'I am a good driver')

Barriers/Facilitators

The model developed by Fylan highlights that there are external factors – barriers or facilitators – that will make certain road safety behaviours either harder or easier to adopt. In the case of speeding, the literature indicates that the 'look of the road' is the most powerful cue for drivers in choosing their speed (Ahie, 2015; Charlton, 2017; Lee, 2017). The type of road also influences speed choice with people more inclined to speed on major roads than minor ones (Goralzik and Vollrath, 2017; Yao et al., 2019). Familiarity with the road and mental imagery of the road also increase the likelihood of speeding (Charlton, 2019).

In contrast there are facilitators that can make it easier for people to drive at or below the posted speed limit. Many of these are covered in more detail in the section on what works and form the basis for the recommendations. A carefully designed combination of social marketing, enforcement, engineering and technology will be required to help people bridge the intention-behaviour gap as suggested by number of authors (Webster, 2010; Toy et al., 2014; Tapp et al., 2016; Turner, 2018; Hyden, 2020).

Effects of barriers/facilitators

External factors can break the link between intention and behaviour to change a driver's actual speed

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