“IF YOU COULD DO ONE THING...”

Nine local actions to reduce health inequalities

JANUARY 2014

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for the humanities and social sciences

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20MPH SPEED LIMITS FOR CARS IN RESIDENTIAL AREAS, BY SHOPS AND SCHOOLS

Danny Dorling

Danny Dorling
Halford Mackinder Professor of Geography at the University of Oxford

SUMMARY

My one suggested intervention is **the implementation of 20 mile per hour speed limits where 30mph ones have usually been in place**.

Over 1,900 people died on Britain's roads in 2011, and the proportion of those that are pedestrians has risen. Introducing 20mph zones would save lives, prevent injuries and reduce health inequalities in the process. It is a low cost measure and a devolved power that can only easily be enacted at the local level. This proposal sets out the case and some of the practicalities for using it:

- Road traffic accident rates are substantially higher in rural areas than urban ones, and they are the single largest cause of death for children and young people aged 5–25. Within urban areas, where the majority of the population of Britain lives, children and young adults are more at risk within poorer localities than richer urban neighbourhoods.
- Death is much less likely if a pedestrian is hit by a car travelling at 20mph, than at 30mph or more, and cyclists are far safer if travelling with traffic that does not exceed 20mph;
- Lower traffic speeds bring many other benefits: less congestion; less air pollution and CO_2 emissions; stronger communities; more walking and cycling; and reduced obesity;
- Councils are already bringing in 20mph areas, and, whilst evidence is limited because implementation is recent, what there is shows marked reductions in deaths and casualties; and
- Introducing 'sign only' 20mph areas is relatively easy, and support for them includes positive messages from police officers and resource commitments from Directors of Public Health. However, changing perceptions of appropriate driving speeds will be a long-term challenge.

In many urban areas in mainland Europe, 18.6mph (30km per hour) is now normal in residential areas. 20mph will become normal in most residential areas in Britain also. All that is in question is how many people will have to suffer before that occurs.

Introduction

The number of people dying on Britain's roads is increasing. In 2011, the number rose by 3%, so that 1,901 people were found dying on the roads in that year. Within that total, the rise in pedestrian deaths was much faster – up by 12% to 453 deaths in 2011 – with children and older people suffering the greatest rises.[1] Deaths for cyclists also rose in the year to 2012, although more people were cycling.

Although these rises are set against a backdrop of normally falling fatality rates, even if death rates continued to fall, I would still propose the intervention that I set out, for the many reasons given below. However, as death rates *are* rising, there is now no excuse not to implement this most effective public health policy as quickly as possible.

The focus of this proposal is on an intervention that, under current UK law, can only easily be enacted at the local level. It is a devolved power. This is the implementation of 20 mile per hour speed limits where 30mph ones have usually been in place. It is making the case for one of the cheapest and most effective methods for improving public health today: slowing down cars. A slow-down would reduce inequalities within cities because it tends to be in the poorer parts of cities that people are most at risk of being hurt or killed by cars.

Besides reducing deaths and injuries, any widespread slow-down of fast cars would reduce the indirect harm that comes from them, including that affecting ill health suffered by the family and friends of those who are victims of road crashes.[2] Other interventions are needed for rural areas where, often, speed limits are above 30mph to begin with. The 20mph policy should be of interest to the general public, local policymakers and Directors of Public Health. Where there is the default 30mph speed limit, it should in almost all cases become 20mph.

Why this intervention and how does it relate to health inequalities?

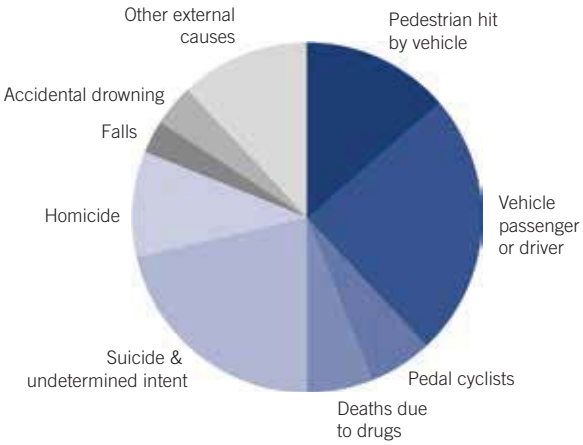
> *"Road traffic casualty rates show steep social gradients, with more disadvantaged areas showing higher rates than the most advantaged areas of England… "*[3]

There are many interventions in British society that I would advocate to improve public health. But, when asked what single policy I would suggest, I always reply "20mph" or, if I'm being a little more verbose: "twenty's plenty". This normally elicits some surprise. The person I am speaking to usually expects me to suggest reducing poverty by reducing unnecessary privileges for the rich, narrowing economic inequalities, raising social mobility, or improving health services or education; not simply slowing cars down. All those other things are very laudable, but if you want to do just one thing, then the thing you can actually do, the one thing that has now been done in over one hundred local authorities in the UK (including in 2013 in the City of London), the thing that makes a difference that you can feel, see and measure straight away, is to stick a sign that says 20mph on a circular piece of plastic over the 30mph signs where you live. And, fortunately, it is now (almost) as easy as that.

Before moving to Oxford, within the city in which I had lived for ten years, Sheffield, in the years 2005–2007 inclusive, some 69 children under the age of ten were recorded as being victims of a road traffic crash in the poorest constituency (Brightside). In contrast, in the richest constituency (Hallam), some 11 children were harmed over the same time period.[4] Both constituencies – Dave Blunkett's and Nick Clegg's respectively – have a very similar number of children, so these differences in child deaths are not about population size. Reducing speeds would protect children and adults in both areas, but the greatest absolute benefits would be felt in the poorer areas. The same social inequality trend can be observed for adults:

> *"There is also an inequalities gradient for men aged 20 to 64 years, where it has been estimated that, annually, there would be 600 fewer deaths nationally if all had the same road traffic collision probabilities as Social Class I."*[3]

Figure 1: Deaths of children aged 11 to 16 in Britain not attributed to disease 2006–7



Source: Dorling, D. (2011), PACTS' 21st Westminster Lecture.

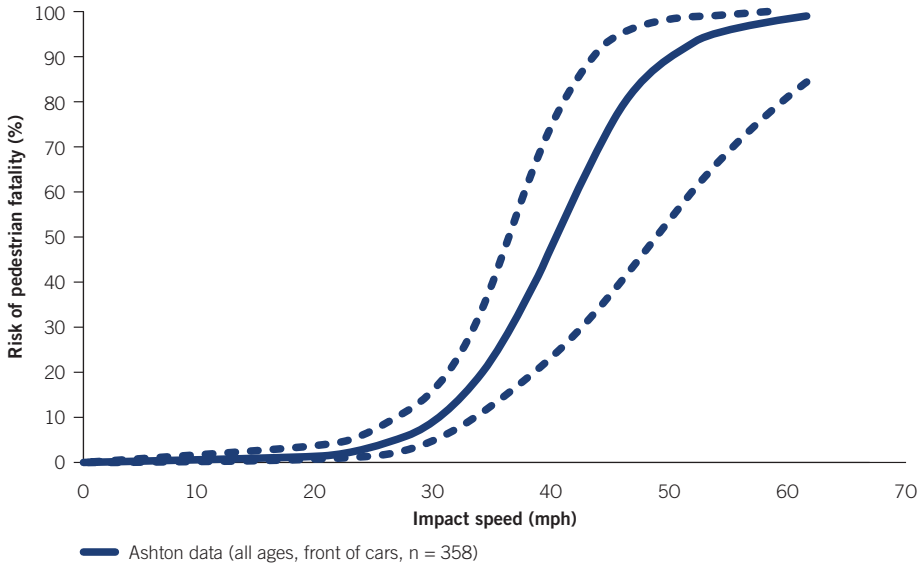
Step back a minute. Why would you want to slow traffic down to 20mph? Surely that would just be annoying? Well, take a look at Figure 1, above.[5] By grouped cause of death, the biggest killer in Britain of children between 11–16 years old (and, in fact, anyone between the ages of 5 and 25) is road traffic crashes. That includes a vehicle hitting a pedestrian, a pedal cyclist being hit by a vehicle (most often a car, sometimes a lorry), or the death of a passenger or driver in a vehicle during a crash. For children, the risk of accidents is higher in faster traffic environments because their eyes are not developed enough yet to be able to judge speeds over 20mph.[6]

When hit by a vehicle travelling at 40mph or above, adults die half the time. In collisions at 30mph, small children are killed in most cases. It would be great to get 40mph roads down to 30mph, and faster roads down to 55mph, but, for now, let us concentrate on most of Britain's residential roads and ensure that speed on them can be reduced to 20mph. The reason is simple: when vehicles are travelling at 20mph or below, most adults and children survive collisions (see figure 2).[7]

During the 1970s, a pedestrian hit by a car in Britain travelling at 30mph had a 20 per cent chance of being killed, while at 40mph there was an 80 per cent chance of death.[8] Radical improvements in emergency medical care, and some changes to the design of cars, have improved those survival chances. However, as improvements to all other medical care has also increased, car crashes are now responsible for a higher proportion of deaths than they were in the 1970s.

Today, you have a 50% chance of not surviving a crash at 40mph, but the increase in the risk of death factor for a rise in speed between 20mph and 30mph is now larger than it was in the 1970s – the death risk rises by a factor of seven. For the over 60s, a rapidly increasing proportion of the population, the risks are higher. Furthermore, 50% of all pedestrian fatalities and 80% of serious injuries, due to the frontal impact of a car, are at 30mph or below, but only rarely at 20mph and below. There are many reasons to want to slow down cars in areas that are currently 30mph, or unnecessarily 40mph, other than saving lives (as I will cover later), but saving lives concentrates the mind.

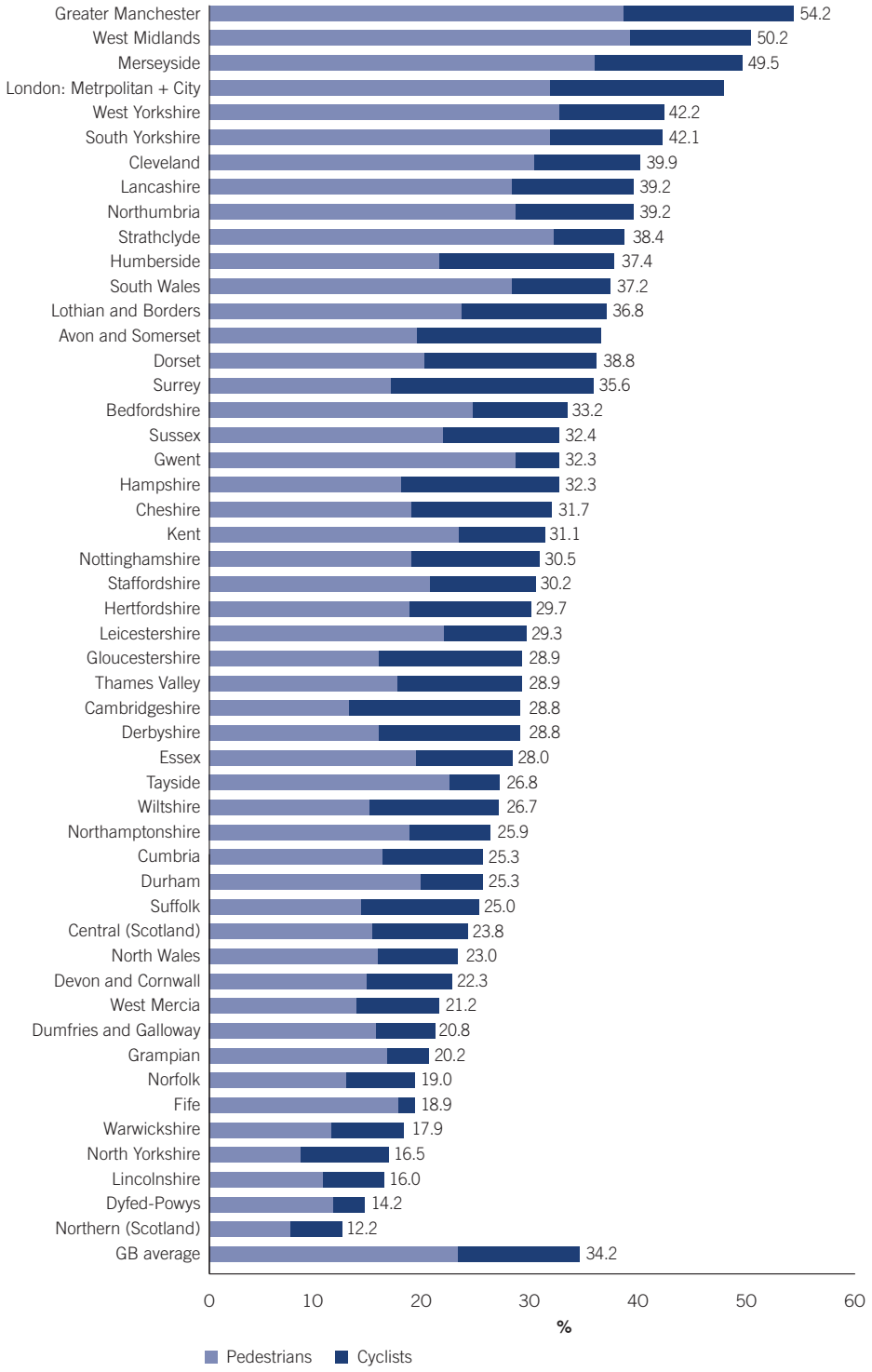
Figure 2: Risk of pedestrian fatality calculated using logistic regression from Ashton and Mackay data.



Note: dashed lines give margin of error.
Source: Richards, D.C (2010) Relationship between Speed and Risk of Fatal Injury: Pedestrians and Car Occupants, Road Saftey Web Publication No. 16, Department for Transport, London.

As cars are made stronger and more like safety cages, an increasing proportion of people killed or seriously injured (KSI) on roads are pedestrians or cyclists. By 2010, over a third of reported KSI cases were pedestrians or cyclists, up from 28% in 2003. As Figure 3 shows, in urban areas such as Greater Manchester and the West Midlands, a majority of people killed or seriously injured on the roads were not travelling in a car or other motor vehicle.[7] In November 2012, when Olympic Gold Medal-winning cyclist, Bradley Wiggins, was knocked off his bike, there was a sign of a change in national mood. Cyclists are at most risk in cities, as it is in cities where they mostly cycle (see Figure 3).

Figure 3: 2010 pedestrian and cyclist KSI casualities as percentage of total KSI (killed and seriously injured), by police force



Source: Richards, D. C. (2010) Relationship between Speed and Risk of Fatality Injury: Pedestrians and Car Occupants, Road Safety Web Publication No. 16, Department for Transport, London.

Broader benefits of 20mph

Reducing deaths on the roads is just the first of a huge number of reasons why introducing 20mph limits across towns, cities and villages makes sense. People should not have to risk such a high chance of death or serious injury wherever and whenever they want to walk or cycle – whether that is to school, to work, to shop or to visit each other's homes. The following list is just a small sample of the many useful briefings made available on the 20's Plenty website:*

1. 20mph is better for drivers – drivers cut their spacing as braking distances contract. Shorter gaps mean more vehicles can use the available road space, reducing standing traffic.[9]
2. Filtering at junctions becomes easier. It is far easier for motorists to pull into traffic travelling at 20mph than at 30mph. It is also much easier for cycles to avoid being cut up by cars and lorries when they are travelling more slowly and turning left less rapidly.[10]
3. Motor traffic volumes decrease, since slower speeds encourage active, sustainable and shared travel. Walking and cycling levels rose by up to 12% after Bristol's 20mph limit was introduced.[11]
4. Buses operate more efficiently. The reduced length of traffic queues means that bus journey times decrease, and become more reliable. Buses become a more attractive alternative to the car.
5. More children are likely to walk or cycle to school on their own. Parents are not tied to the school run, and children have their freedom increased.
6. Older people are less fearful of going out of their home, trying to cross the street, or of driving their own cars at a reasonable (i.e. slower) speed, rather than always at 30mph.
7. All those people who are afraid to cycle become more likely to cycle. The population as a whole benefits from not sitting in cars and getting fatter and fatter.
8. Pollution is reduced, less petrol is consumed, and – ultimately – fewer wars need be fought over oil. Areas like the Antarctic may not need to see oil wells and pollution engulf them.
9. Neighbourhoods work better locally. There is a greater incentive to use local shops rather than drive to supermarkets. 20mph is very good socially, locally as well as environmentally, globally.
10. People learn that, if they can alter their environment to make it more sociable in terms of speed, then maybe there are other things they can change.

The introduction of 20mph zones: examples of where it has been done and the outcomes

You introduce 20mph by local councillors voting it through. To be able to vote it through they need to be convinced of the evidence, and to know that they are not alone in implementing it. In that respect, it is not just in towns that 20mph is being introduced, but also in many villages:[12]

* www.20splentyforus.org.uk/briefings.htm

"*From February 2011 to June 2012, twenty five 20mph limits without traffic calming measures were implemented in towns and villages across the East Riding of Yorkshire. Limpley Stoke is amongst six Wiltshire villages where limits were agreed in 2010. Suffolk are turning Middleton cum Fordley and Fressingfield 20mph. 20mph limits will be installed in Dunbar, East Lothian. City of York Council plans to limit its larger satellite villages – thereby extending 20mph beyond the outer ring road*".

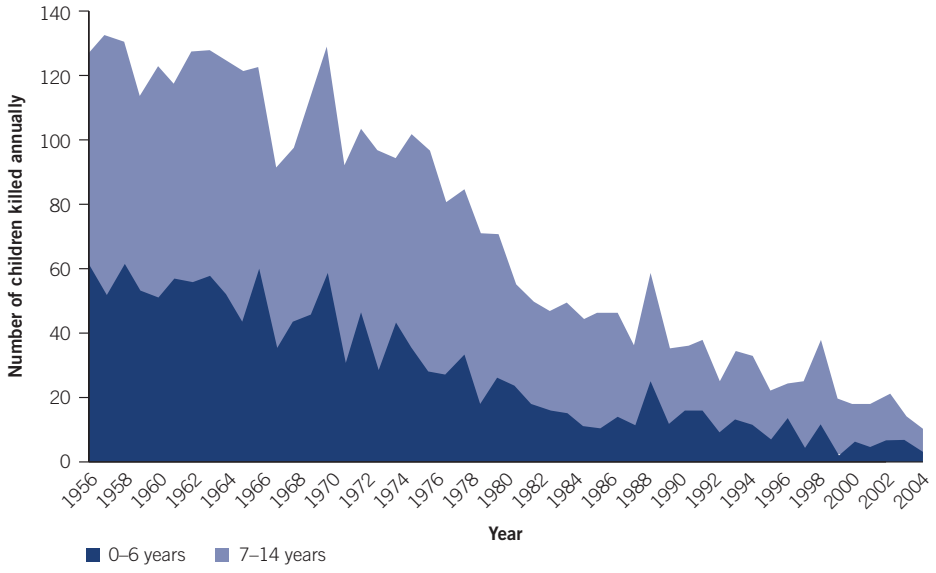
Councillors also need to know that it is not just happening, but *working* in other areas. They need to know about evidence from robust designs,[13] but they also need more easily understandable examples of what works. In Burnley, Lancashire, just the pilot scheme to introduce 20mph from February 2011 to April 2012 resulted in this statistical release:

"… the overall figures fell from 46 casualties a year, with six deaths and serious injuries, to 25, with two deaths and serious injuries, and no child deaths and serious injuries." [14]

At almost the same time in Newcastle upon Tyne it was recently reported that: *"The number of car-related accidents on Newcastle's residential streets has dropped by more than half in some areas of the city following the council's introduction of 20mph speed limits*".[15]

Councillors, the public and activists can look to many parts of Britain now to see the effect on public health and inequality of 20mph being introduced.[16] But if they want to see the long-term effect of a whole series of sensible road safety policies, then they need to look a little further away, to Sweden – where 30kmph (18.5mph) is common in residential areas. Figure 4 shows what is achieved when, among other factors, such speeds become normal.

Figure 4: Children killed in road traffic crashes in Sweden, 1956–2005



Source: Johansson, R., (2009) Presentation: Chief Strategist, Road Safety Division, Swedish Road Administration, Improving Road Safety in Scotland: Prevention and Best Practice. Edinburgh, Tuesday 3rd February

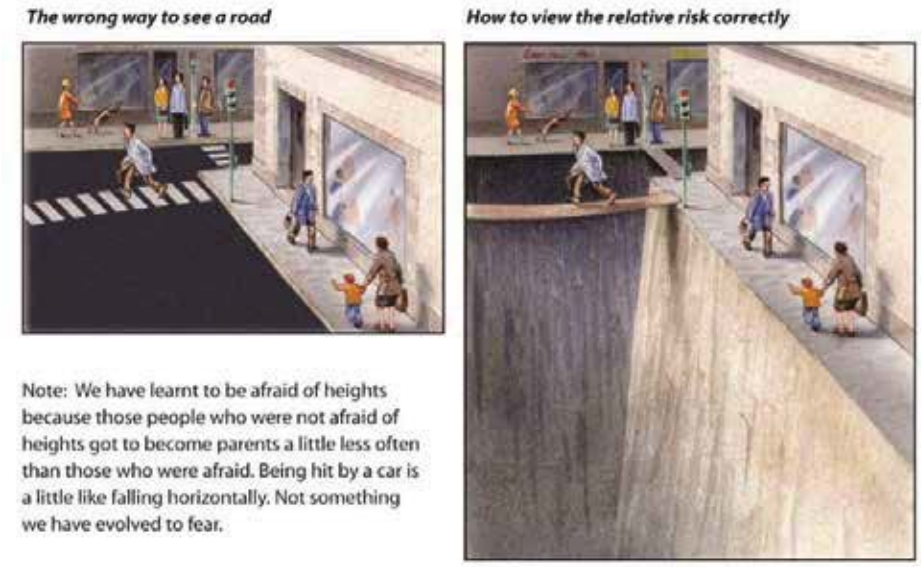
Figure 4 shows how the number of children killed on the roads in Sweden reduced from over 120 a year in the 1950s and 1960s to less than ten a year now (despite a large rise

in the Country's population over the same period). That rate has fallen extremely quickly. However, this number of deaths is still viewed as too many in Sweden. Its policy is that no one should die on the roads. In Britain, deaths and injuries are viewed as a price worth paying by cost-benefit modellers. Another way is possible.

In contrast to Sweden, the high number of deaths from fatal traffic accidents and homicides in the USA substantially account for why many adults die young there, with high variation in the age at which people die.[17] In other words, deaths on the road in the USA (as well as homicides) are so important that they explain a large part of the difference in mortality rates between Sweden, which has one of the highest life expectancies in the rich world, and the USA, which has the lowest of life expectancies among all of the world's richest 25 large countries.

Finally, there is a 'safety in numbers' argument to be made for reducing road speeds, which strengthens the case for the more widespread introduction of 20mph zones. As the numbers and proportions of both pedestrians and cyclists increase, drivers become more aware of these groups. And, as they do, the casualty rate per unit of exposure decreases.[18] Safety improves as drivers adapt their behaviour – and the reality of roads less resembles the environment exposed in Figure 5.[19] In 30mph speed areas you need to see the urban environment as being full of chasms.

Figure 5: How we might view roads had we more time to evolve with them



Source: Johansson, R., (2009) Presentation: Chief Strategist, Road Safety Division, Swedish Road Administration, Improving Road Safety in Scotland: Prevention and Best Practice. Edinburgh, Tuesday 3rd February

So what do you have to do to actually introduce 20mph limits in your areas?

Probably the most efficient, and certainly the lowest cost way to bring in 20mph is simply to change the road signs. Traffic calming with speed humps and mini-roundabouts is very expensive and this tends to limit the size of the area which is calmed. There may be

places where such physical calming is warranted, for instance to force down speeds at accident black spots, but simply changing aggregate behaviour is possible by shifting what is perceived as an acceptable norm. It has been done with sanitation, spitting and (more recently) smoking, so why not with driving? You can gain 20mph in your area and then sit back, or you can lobby for it to become the national residential road speed limit.

We are getting very close to the point where it now makes sense as a national limit. The tipping point may well be the decision reached in summer 2013 for all the roads in the City of London to switch to be 20mph. Already all the surrounding boroughs other than Westminster have adopted 20mph maximum speeds on all residential roads. If all the residents of, and workers in, the City of London are now to be protected by their area having all streets being 20mph, then why is such safety not deserved by all the rest of us?

There is controversy over what some call *'signs-only 20mph'*, as most of the evidence that 20mph zones are effective comes from areas where some physical barriers have also been added, such as road humps, to slow down cars and lorries. However, the lack of evidence from signs-only 20mph areas is due to there being fewer such areas as yet, and thus fewer studies. I think we would do best to call one set of areas '*20mph physical traffic calmed areas'*, and the other set '*20mph zones*' (like 30mph zones).

Government has recently changed the law so that extra 'repeater' poles indicating the new, reduced speed limit need not be erected in 20mph areas. As this change has only just happened, there is a limitation in the evidence as to whether areas with the same number of 20mph signs as 30mph signs work – because, as yet, there are no such areas to test. Nevertheless, there is some evidence about the general improvement that comes when speeds are lowered[20] and which suggests humps may not be needed: *"A trial in Scotland of 20 mph (32 kph) limits without traffic calming measures at 78 sites found reductions in speed and casualties, concluding that such limits offer a low cost option for promoting road safety".* In another study,[13] 20 mph zones in London were found to have reduced casualties by 41.9%. They did this when the gap was measured between areas in which the zones were introduced between 1991 and 2007 and were found not to have increased casualties in surrounding areas.

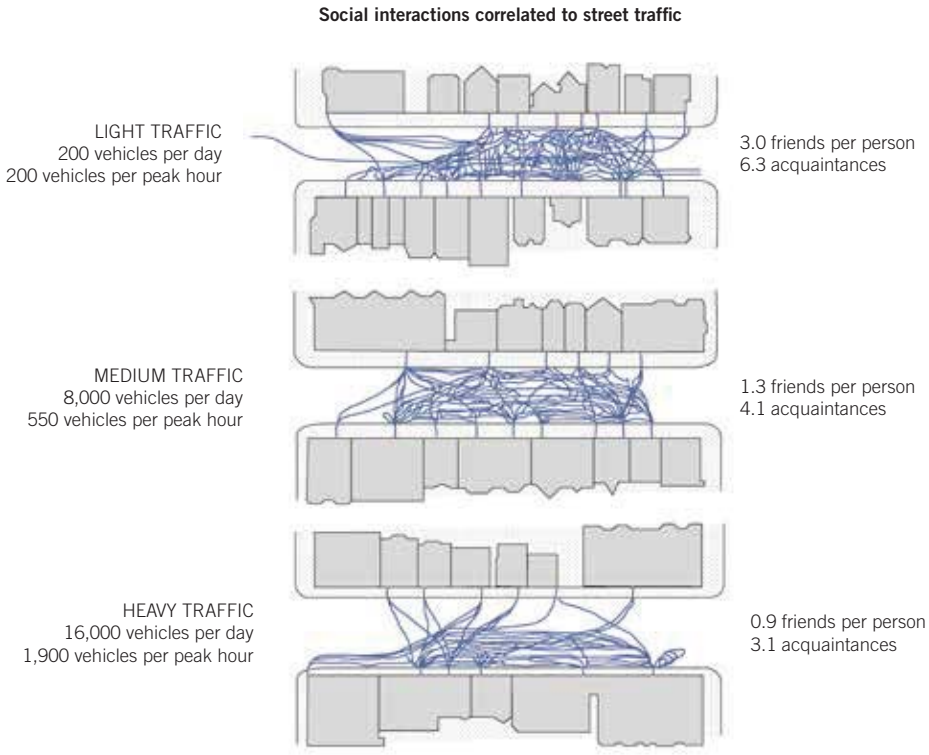
Evidence will build over time as the number of signs-only 20mph areas grows. There will come a point when so many people are living within 20mph areas that, to avoid confusion as much as to save lives and improve public space, national government will most likely seek to change the default speed where there is street lighting to 20mph, unless otherwise indicated. With a little more agitate and persuasion, that point could be reached earlier, more lives saved, and more areas made more hospitable. There is no rule that says that the UK has to always lag behind other countries in improving the health and environment of its people.

Traffic speeds, communities and public health

As long ago as 1969, while working in San Francisco, Donald Appleyard identified that sociability reduces as traffic increases.[21] Figure 6 demonstrates this, with the red lines indicating people's movements around their street, and far less people crossing roads to visit or talk to people in busier streets. Appleyard found that *"…residents of lightly*

trafficked streets had two more neighborhood friends and twice as many acquaintances as those on the heavily trafficked streets".[22] He died in 1982, hit by a car the year after his book was published.

Figure 6: Donald Appleyard's measurements of social interaction in different streets

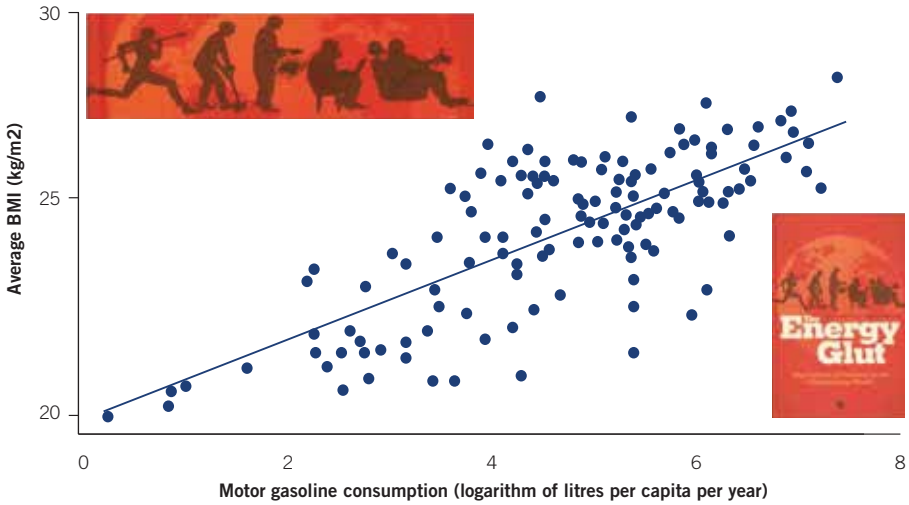


Source: www.carfreeinbigd.com/2012/01/point.html, in turn from Appleyard, D. (1981) Liveable Streets, Berkley: University of California Press

There are so many good reasons to slow vehicle traffic down, to get more people walking and cycling, to make our towns, villages and cities more liveable, that it is hard to know where to begin any list. One novel place to start is with the current obesity epidemic and, as Figure 7 shows, how closely growing obesity can be linked to the growing consumption of gasoline.[23] In contrast to how many die being struck by a car, cars almost certainly kill far more people through the pollution they cause, the exercise they rob us of and, possibly, also through the wars that are fought over the oil to power them. Reducing speeds from 30mph to 20mph is a small step towards mitigating these wider harms.

If we saw cars as being as important an influence on our poor health as we now see cigarettes, we would not have such a benign view of them. But, just as we were once in love with tobacco, so a few may remain infatuated with the motor car. We just don't see the danger in the way we would see it if we had had long enough to develop an evolutionary fear of driving (in the way that many of us have developed a fear of heights – see and imagine driving along Figure 8). Because we do not have this fear, our reflexes are not attuned to 30mph. Instead, we have to slow cars down.

Figure 7: Gasoline Consumption and Body Mass Index (BMI), Countries of the World – 2010



Source: Robert, I. and Edwards, P. (2010) The Energy Glut, The politics of fatness in an overheating world, London: Zed Books

Figure 8: Imagine that this is your carriageway

Source: Johansson, R., (2009) Presentation: Chief Strategist, Road Safety Division, Swedish Road Administration, Improving Road Safety in Scotland: Prevention and Best Practice. Edinburgh, Tuesday 3rd February

There are far wider reasons to support a 20mph speed limit in cities and to bring speeds down outside. For example, to reduce pollution:

> *"Transport is the only sector where greenhouse gas emissions are rising. When 30km/h (18.6mph) zones were introduced in Germany, car drivers changed gear 12% less often, braked 14% less often and required 12% less fuel. This implies 20mph limits without humps can cut residential transport emissions by 12%. Traffic smooths, gaps*

between cars shorten, it's easier to merge and there's less idling with dangerously concentrated pollutants".[24]

Research over a decade ago made clear that poorer children suffer most: *"Although the number of child pedestrian casualties has been falling, this is mirrored by a reduction in walking (e.g. to school) as more children are ferried by car, so it is not clear that roads have become safer".*[25]

Today, directors of public health are increasingly seeing the connection between transport and health, and in some cases agreeing to help fund local road speed interventions: "*In Liverpool the Primary Care Trust (PCT) is contributing 40% – £665k of £1.665m – to 20 mph limits,* £400k (28.5%) of £1.4m *[needed] to implement 20mph signed limits over four years, plus £265k for perception surveys and extensive public health promotion of 'The 20 Effect' for safer streets".*[26]

Overcoming problems and policing 20mph

Although the 20mph campaign is about local decisions, there are residential roads which are not in local control – these are the trunk (A) roads. However, given that new thinking is driving the introduction of 20mph areas, then new thinking could also bring about a reclassifaction of trunk roads to bring them under local control. New understanding and solutions are needed in other areas too. The geography of car crashes is one example. Maps showing the areas of London with the highest proportions of traffic crashes due to hit and run incidents reveal stark patterns waiting to be better understood (see Figure 9).

ashes in London, 2010 and 2011