

Festina Lente

Roderick J McClure 

This Latin, and before that Greek, adage (perhaps more recognisable in the form of its English equivalent 'More haste less speed') has stood the test of time.

Speed is a known determinant of road crash death. The maximum vehicle travel speed that we permit on our roads is a design setting that, in combination with other road design features, establishes the crash injury performance of that road system. Reducing speeds at which road vehicles travel reduces both the frequency of crash and the forces transferred at the point of collision. Reducing frequency of crashes and magnitude of transferred force will decrease the number of serious crash injuries and severity of the injury sustained, and thus improve the crash injury performance of the road system. All else being equal, the speed permitted on the road needs can be set to deliver the crash injury performance outcome that is desired.

The correlation between vehicle speed and crash injury has been universally accepted for as long as there have been speed limits on roads. What part of this problem do we still not understand?

Two manuscripts published this year in *Injury Prevention* have focused on an answer to this question; it's the intervention part. Each manuscript describes results from a natural experiment, with their respective research locations being on either side of the Atlantic. Both manuscripts evaluated the impact of lowering the speed limit on a city's roads. In Bristol the effect was measured in terms of crash injury outcomes, and in Boston in terms of vehicle speeds. Together, these papers present the important *why*, *what* and *what next* for a society that has the necessary information but is afraid to use it.

Bornioli and colleagues¹ introduce their paper with the well referenced argument that links vehicle speed to crash injury statistics and explains the logic behind the WHO's recommendation to limit traffic in residential areas to a maximum of 20 mph. They also noted the 2018 finding of the UK Department of Transport's technical report² that there is insufficient field trial evidence of effectiveness of interventions based on the

logic of observed speed-injury correlation. An opportunity arose to evaluate a sequenced introduction of an intervention reducing most 30 mph streets in Bristol to 20 mph limits between 2010 and 2015, which the authors took advantage of, using a stepped wedge epidemiological study design. The effect of the sign-only speed limit reduction was evaluated against crash deaths outcome. Bornioli and colleagues¹ found that while the speed limit reduction did not bring average speeds down in the intervention 20 mph zones to the extent desired there appeared to be some carry over effect into the remaining 30 mph non-intervention zones that reduced average speed in those zones as well. There was an important but non-significant reduction in injury across all severity categories in the 20 mph zones after the intervention, a minimal non-significant reduction in the non-fatal injury at the city level (inclusive of 20 mph and 30 mph zones) and an important significant reduction of fatal injury at the city level (inclusive of 20 mph and 30 mph zones).

Hu and Cicchino³ introduce their paper with the premise that lowering of speed limits has been undertaken in Australia, Canada and the UK, with consequent reduction in road crash deaths. They contrast this information with the trend to increase speed limits in the USA and the related increase in crash deaths. With the rise in pedestrian deaths in the USA some cities are using their prerogative to change speed limits without having to recourse to State-level authority or engineering department involvement. In Boston, an opportunity arose to evaluate one such intervention in January 2017 where default speed limit on city streets was reduced from 30 mph to 25 mph. The effect of the speed limit reduction was evaluated in terms of changed vehicle speeds preintervention and postintervention compared with vehicle speed change in control sites in Providence, Rhode Island. Hu and Cicchino³ found that lowering speed limit from 30 mph to 25 mph with associated signage and media activity but without known increased enforcement and no traffic calming engineering did little to shift the mean speed but did bring down the right side tail of higher speed drivers.

While not providing perhaps the definitive outcomes the authors may have expected, the findings of the two natural experiments were entirely consistent both with each other and the previous literature on the subject.

Why is this ongoing research into speed and injury still necessary? Because there remain societal interests that believe the evidence for effectiveness of lower speed limits is not sufficiently clear to support investment in implementing the WHO recommended policy of 20 mph speed limits.

What is the research needs highlighted by the two manuscripts? It is the need to continue to refine approaches to implementation and evaluation of multi-component or complex interventions. While each manuscript provides some support for a beneficial effect of lower speed limits, neither provides the definitive evidence required to support policy change. The lack of a clear outcome from the single factor speed limit reduction is not evidence that speed limits are not important. The lack of a clear outcome does seem to indicate that speed limit signage alone is not an optimal intervention. The authors of each manuscript call for research to further explore the relationships between speed limits (and its cofactors) and vehicle speed behaviours the limits are trying to ensure.

What do we do next? This is where I think we should be making things a little less complicated. If speed is a known determinant of road crash death, and we have known this for a very long time, why are we still muddling along with indecisive policies. The theory is incontrovertible. The costs and benefits of speed reductions can be accurately modelled. The modelled financial benefits of lower speed limits are of a magnitude that will justify large-scale definitive trials of speed reduction policies. Once the trial evidence is in we can act accordingly with some certainty. When we agree on the solution it going to be a simple one to implement. What's with our current confusion?

Why do we keep making injury prevention so complicated?

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