

## Toward improved evaluations of laws against drink-driving



On Dec 5, 2014, Scotland lowered the legal blood alcohol concentration (BAC) limit for driving to 0.05 g/dL. In *The Lancet*, Houra Haghpanahan and colleagues<sup>1</sup> report their study using data from Scotland (the intervention group) and England and Wales (the control group) for the period from Jan 1, 2013, to Dec 31, 2016, to assess the effect of this change on frequency of road traffic accidents (RTAs) and on alcohol consumption. Their evaluation indicates that the reduced BAC limit in Scotland was not associated with a decline in RTAs (rate ratio 1.07, 95% CI 0.98 to 1.17;  $p=0.10$ ), and did not affect alcohol sales in grocery and convenience stores (off-trade sales  $-0.3\%$ , 95% CI  $-1.7$  to  $1.1$ ;  $p=0.71$ ). However, a slight but statistically significant decrease was observed for alcohol sales in bars and restaurants (on-trade sales  $-0.7\%$ ,  $-0.8$  to  $-0.5$ ;  $p<0.0001$ ).<sup>1</sup>

The assessment of Scotland's new BAC law rests on a robust, comparative, interrupted time-series design and, accordingly, the results show strong internal validity. However, the findings deviate from the general evidence that lowering the BAC limit for driving prevents alcohol-related RTAs.<sup>2,3</sup> Results from Haghpanahan and colleagues' study also question the relevance of a recent recommendation to introduce a 0.05 g/dL limit in England,<sup>4</sup> which is estimated to potentially save about 25 lives and prevent 100 serious traffic injuries per year.

Law or programme evaluations are generally supported by a theory of change, which takes the form of an explicit model explaining how the intervention is expected to produce the intended outcomes. The theory of change guides the evaluation.<sup>5,6</sup> Results from the Scottish experiment<sup>1</sup> call for additional evaluations based on advanced theories of change, especially in an era in which several improvements in alcohol-related RTAs have been achieved.

Evaluations of BAC laws should shift their focus from what works to how it works. Theories of change are usually used to justify the introduction of new prevention programmes known for their effectiveness. However, the main propositions in theories of change need to be empirically challenged.<sup>7</sup> The effectiveness of BAC laws is mainly embedded in deterrence:<sup>8</sup> sanctions and other negative consequences prescribed by the law should deter people from drink-driving. According to this logic, BAC laws must be enforced and publicised to

change outcomes in the short-term (ie, risk perceptions and attitudes toward drink-driving), intermediate-term (ie, strategies adopted to avoid drink-driving), and long-term (ie, RTAs).<sup>9</sup>

Most studies focus on RTAs and neglect to investigate the implementation of, and processes associated with, BAC laws.<sup>2</sup> Haghpanahan and colleagues are among the few to estimate changes in on-trade alcohol sales after the introduction of the new BAC law. A decline in alcohol consumption, however, represents just one possible mechanism that could trigger a decrease in alcohol-related RTAs.<sup>8</sup> People might also change their drinking habits: for example, they could drink over longer periods to respect the new BAC limit.

Furthermore, improved evaluations will only be possible if theories of change incorporate assumptions about situations in which BAC laws can be ineffective or produce backlash effects.<sup>10</sup> For example, there might be specific defiance by individuals and general defiance by collectives, referring to situations in which sanctions are perceived as unfair and excessive. Fairness and legitimacy are two necessary conditions for criminal sanctions to lower, and not increase, offences.<sup>11,12</sup> Furthermore, compliance with BAC laws increases when people are aware of—and offered—legitimate alternatives to drink-driving.<sup>13</sup> Therefore, a deficient public transportation system or the absence of designated driver programmes could partly explain the ineffectiveness of a BAC law.

Published Online  
December 12, 2018  
[http://dx.doi.org/10.1016/S0140-6736\(18\)33166-0](http://dx.doi.org/10.1016/S0140-6736(18)33166-0)  
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For more on the upcoming study on the Scottish BAC limit change see <https://www.cso.scot.nhs.uk/wp-content/uploads/HIP51649.pdf>

Future evaluations of BAC laws also need to account for organisational contexts in their theory of change.<sup>9</sup> A programme implemented with high fidelity is generally successful. Inadequate enforcement and publicity might explain the failure of the law in Scotland seen in Haghpanahan and colleagues' study, but information on such activities is not provided in the Article. A parallel study is underway to explore Scotland's BAC limit change from the perspective of the public, police, and alcohol retailers. This upcoming study will also examine the magnitude of enforcement efforts (eg, indicators on sobriety checkpoints, arrests, and drivers tested) and public campaigning to better understand these results. Ensuring programme fidelity requires planning and monitoring activities to ensure that all partners fulfil their duty in a timely manner. Thus, future research needs to provide information about strategies used to implement and coordinate various advertisement and enforcement activities.<sup>9</sup>

The best evidence indicates that new BAC laws prevent RTAs when they are effectively enforced (meaning that resources are required to conduct highly visible enforcement activities) and are supported by public communication campaigns. Other legal initiatives (eg, random breath testing) and public education initiatives generally enhance the safety effects of BAC laws.<sup>2,3,8</sup> The Scottish experiment, however, shows that additional research is needed to identify essential components of effective BAC laws according to different contexts. Evaluations based on improved theories of change could lead to better understanding of how BAC laws change behaviours and how they can be implemented with high fidelity.

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We declare no competing interests. We thank Katherine Pendakis for her help in preparing this Comment.

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## Calcium supplementation for prevention of pre-eclampsia

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In *The Lancet*, G Justus Hofmeyr and colleagues report the findings of a multicentre, double-blind, randomised trial evaluating the effect of prepregnancy and early pregnancy calcium supplementation (500 mg orally once a day) versus placebo in populations likely to be calcium deficient from South Africa, Zimbabwe, and Argentina.<sup>1</sup> The trial was limited to parous women who had had eclampsia or pre-eclampsia in a previous pregnancy. In addition to being randomised to early calcium supplementation, all 1355 participants were prescribed calcium (1.5 g once a

day) after 20 weeks' gestation. The primary outcome was pre-eclampsia and the authors report no significant effect of prepregnancy and early pregnancy supplementation (23.3% vs 28.9% prevalence in treated and placebo groups; risk ratio (RR) 0.80; 95% CI 0.61–1.06; p=0.121). As suggested by the authors, the negative result might be due to inadequate sample size, although the sample size required by the power calculation was reached.

The rationale for using a lower dose of calcium than known to be effective<sup>2</sup> at later gestations was that this