TRAFFIC INJURY RESEARCH FOUNDATION

ROAD SAFETY MONITOR 2014:
DRIVER BEHAVIOUR & WILDLIFE ON THE ROAD IN CANADA

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DRIVER BEHAVIOUR TO WILDLIFE ON THE ROAD IN CANADA

This fact sheet summarizes national results from the Road Safety Monitor (RSM) 2014 regarding wildlife-vehicle collisions (WVCs) in Canada. The RSM is an annual public opinion survey conducted by the Traffic Injury Research Foundation (TIRF) in partnership with State Farm Canada, Beer Canada, and Toyota Canada Foundation. It takes the pulse of the nation on key road safety issues by means of an on-line survey of a random, representative sample of Canadian drivers.

In 2014, as part of a larger project to better inform researchers and practitioners and to help educate the public, TIRF collected data on self-reported driver behaviour in relation to collisions and near misses with wildlife on the road. Additionally, respondents were asked to report what they thought drivers should do when they encounter an animal on the road. The following results are based on analyses of RSM 2014 data, the first year data has been collected on this issue. The survey data were weighted and stratified by province and/or region.

Background. Given Canada's expansive natural rural environments and integration of nature with urban areas, interactions between drivers and wildlife on the road are one of many concerns for road safety researchers and practitioners alike. Unfortunately, data on wildlife vehicle collisions (WVCs) that could help improve knowledge on this issue are substantially limited due to various factors such as under-reporting or inconsistent data collection across jurisdictions (Vanlaar et al. 2012). Equally important, an environmental scan of Canadian information in 2014 revealed that there are limited and inconsistent educational resources available to Canadians regarding ways to safely respond to wildlife on roads.

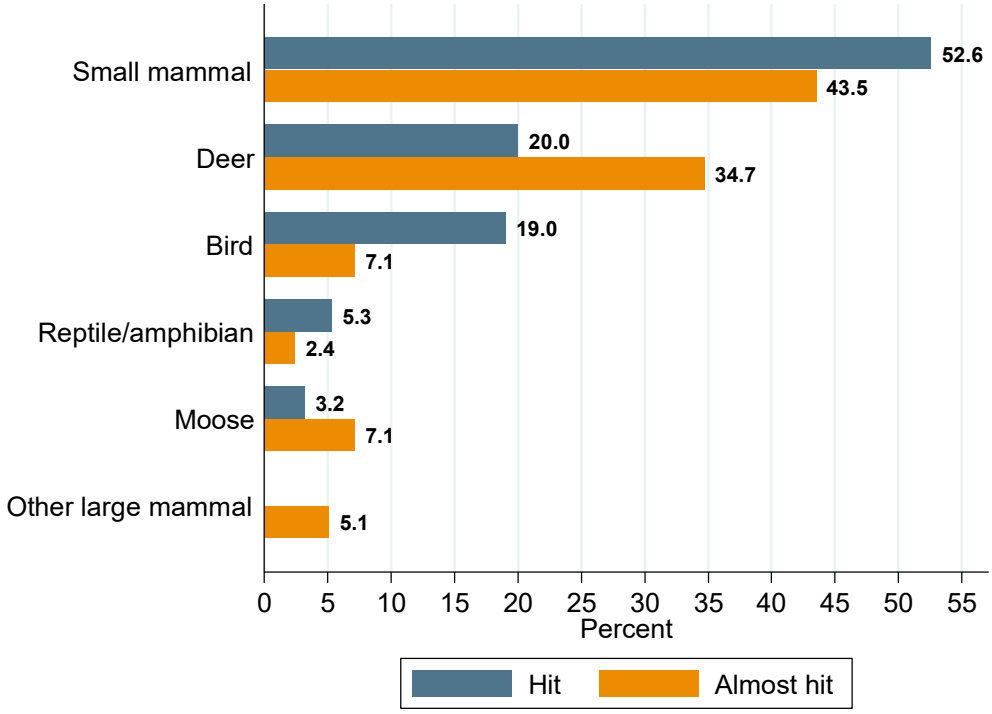
How drivers react to wildlife on the road is critical to the safety of both road users and wildlife. In most cases, with the exception of moose, the safest driver response to wildlife is to slow down in a controlled manner and steer straight, even if the animal is in the pathway of the vehicle. Most animals are not likely to remain still and, since their behaviour is unpredictable, drivers cannot anticipate which direction the animal will move. This is especially true of deer whose natural defence is to dart and zig-zag to avoid predators. Likewise, swerving to avoid animals is often much more dangerous and is not recommended in most situations (Insurance Information Institute n.d.). More collisions are caused by drivers who swerve to avoid striking an animal and instead lose control of their vehicle and/or collide with other road users or hazards.

How serious a problem is wildlife on the road? Among Canadian drivers, 28.4% consider wildlife crossing or standing on roads a serious problem. Within this group, males and females differed significantly on the issue, where 21.6% of male drivers ranked wildlife on the road as serious in comparison to 34.4% of female drivers. Although respondents in general ranked other road safety issues as more concerning, such as drinking or drugged drivers (refer to the Road Safety Monitor 2014: Drinking and Driving in Canada for more information), more than one-quarter of drivers think WVCs are nevertheless serious, demonstrating its importance to, and potential impact, on a number of Canadians.

What percentage of Canadians report hitting or almost hitting wildlife? To obtain an overall picture of Canadians affected by WVCs, respondents were asked how many times they had hit or almost hit wildlife on the road. Within the last year, 9.2% of drivers reported hitting an animal one or more times and 28.5% reported that they almost hit an animal one or more times.

Respondents were also asked to indicate the type of animal they hit or almost hit from the following choices: deer, moose, other large mammal (e.g., elk, bear, or wolf), small mammal (e.g., fox, groundhog, or squirrel), reptile/amphibian (e.g., turtle, snake, or frog), and bird (e.g., goose, duck, or crow). Small mammals accounted for the majority of animals that were hit (52.6%), followed by deer (20.0%), birds (19.0%), reptiles/amphibians (5.3%), and moose (3.2%) (see Figure 1). Similarly, small animals made up the majority of animals almost hit (43.5%), and then deer (34.7%), birds (7.1%), moose (7.1%), reptiles/amphibians (2.4%), and other large mammals (5.1%).

Figure: 1 Percent of different types of animals hit and almost hit



The results for small mammals, birds, and reptiles/amphibians can be combined into a single category for small animals in order to present a clearer picture of WVCs. As such, small animals account for the majority of all animals that were hit (76.9%) or almost hit (53.0%) by respondents. This higher frequency likely reflects the larger numbers of many of these smaller animals and the greater chances of drivers coming across small animals in both urban and rural environments relative to larger wildlife. While collisions with smaller animals pose a lesser threat to drivers from a road safety perspective, small wildlife such as frogs, squirrels, or turtles are important to biodiversity and changes to their populations can negatively affect

habitats and ecosystems. The survey results suggest that greater attention is perhaps needed regarding the impact of road systems on small animals, particularly in relation to efforts to protect species at risk.

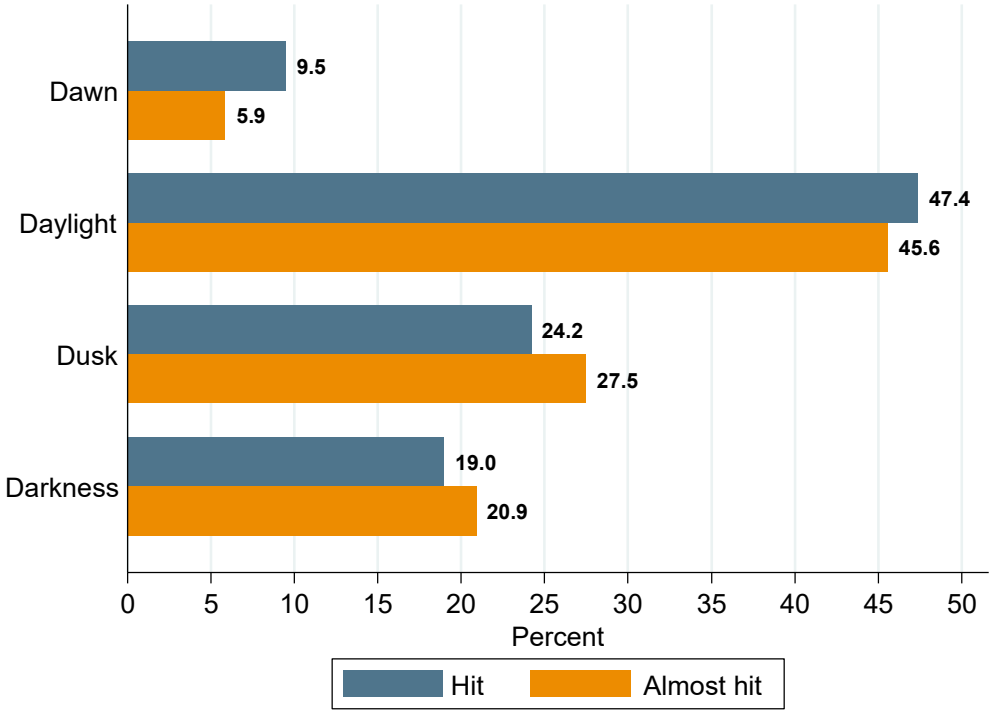
Results futher showed that a single large mammal (deer) accounted for the second largest number of collisions and near collisions with wildlife as reported by respondents. This is not surprising as deer populations have grown and they are increasingly found in suburban and urban environments (Ng et al. 2008). However, as a large animal, collisions with deer pose serious risks to road users. Given the frequency of hitting or almost hitting deer and the size of deer, it is important that Canadian drivers know how to safely react to these animals when they are on or near roads.

Although moose represented a much smaller proportion of encounters, their size and weight as previously discussed make them one of the most dangerous animals that drivers can strike. Like deer, the possibility of hitting (3.2%) or almost hitting (7.1%) a moose is relatively high, particularly in comparison to the category of other large mammals. Due to their unique dangers and the greater likelihood of encountering moose in Canada, more education to ensure drivers know the safest strategies to react to these animals should also be considered by various road safety and conservation organizations.

Under what light conditions did respondents report hitting or almost hitting wildlife?

Respondents were asked to indicate the light conditions when they encountered wildlife. Since daylight hours in Canada change significantly between seasons and across regions, respondents were asked to identify the light conditions (dawn, daylight, dusk, and darkness) rather than the time of day. Based upon the information reported by respondents, almost half of all collisions or near collisions occurred during daylight (see Figure 2). More specifically, 47.4% of collisions and 45.6% of near collisions with wildlife occurred during well-lit conditions. This was followed by dusk (24.2% hit and 27.5% almost hit), darkness (19.0% hit and 20.9% almost hit), and dawn (9.5% hit and 5.9% almost hit).

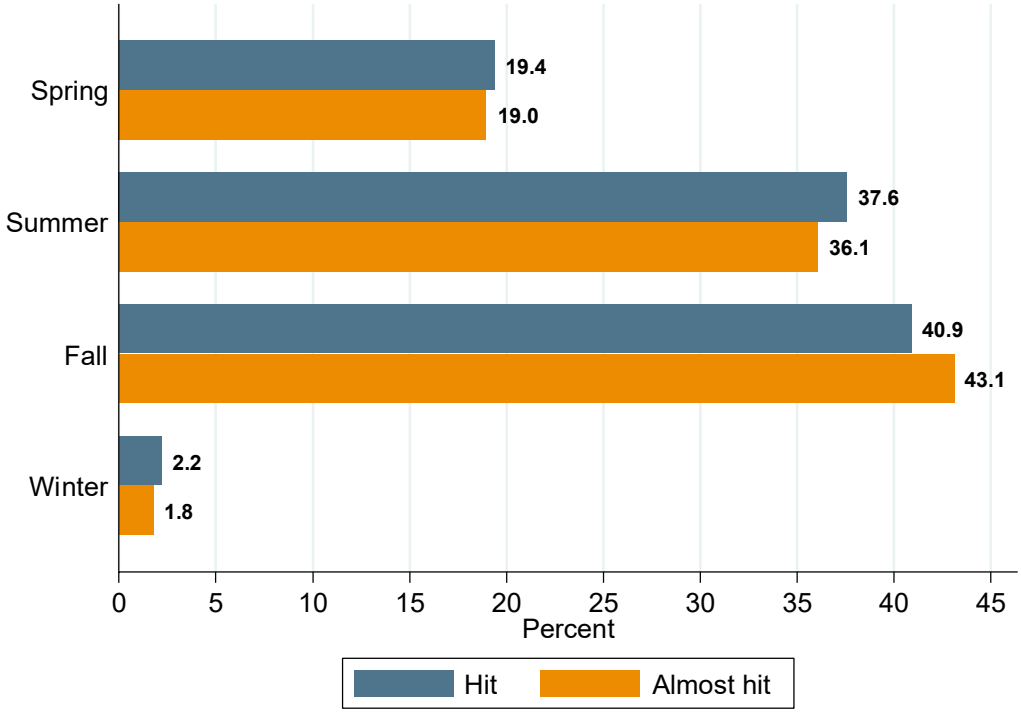
Figure 2: Percent of drivers who reported hitting or almost hitting wildlife under different light conditions



Studies show that most collisions with animals occur at dawn, dusk, and during high traffic volume periods such as rush hour (Weir 2002; Gunson et al. 2011; Sullivan 2011). The results of this study appeared to support the research showing the larger number of daylight collisions are likely due to increased travel during the day, such as rush hour, and could be an important factor in the frequency of WVCs in Canada. Similarly, dusk accounted for the second most frequent occurrence of WVCs and according to the research this time is when WVCs typically occur.

During which seasons did respondents report hitting or almost hitting wildlife? Respondents were asked to indicate which season, spring (March, April, May), summer (June, July, August), fall (September, October, November) and winter (December, January, February) they collided or nearly collided with wildlife. Fall was the most frequent response with 40.9% of respondents who hit wildlife and 43.1% who almost hit wildlife (see Figure 3). Summer had the second highest proportion of occurrences with 37.6% who hit and 36.1% who almost hit wildlife. Spring followed with 19.4% who hit and 19.0% who almost hit wildlife, and then winter with 2.2% who hit and 1.8% who almost hit wildlife.

Figure 3: Percent of drivers who reported hitting or almost hitting wildlife during different seasons



Differences in the results between fall and summer were not significant meaning that both seasons were not necessarily different in terms of numbers of collisions and near collisions with wildlife. The higher reported frequency of collisions in the fall corresponds to the greater likelihood of encountering wildlife at this time of year due to increased animal movement for winter migration, mating season, and to avoid hunters. However, various research studies indicated that spring can also result in high or even higher frequencies of collisions due to spring migration and increased presence of young, vulnerable animals (Sullivan 2011). The high frequencies in summer likely reflect the larger number of people travelling for vacation, particularly through more rural or summer vacation areas where many animals are active during summer months.

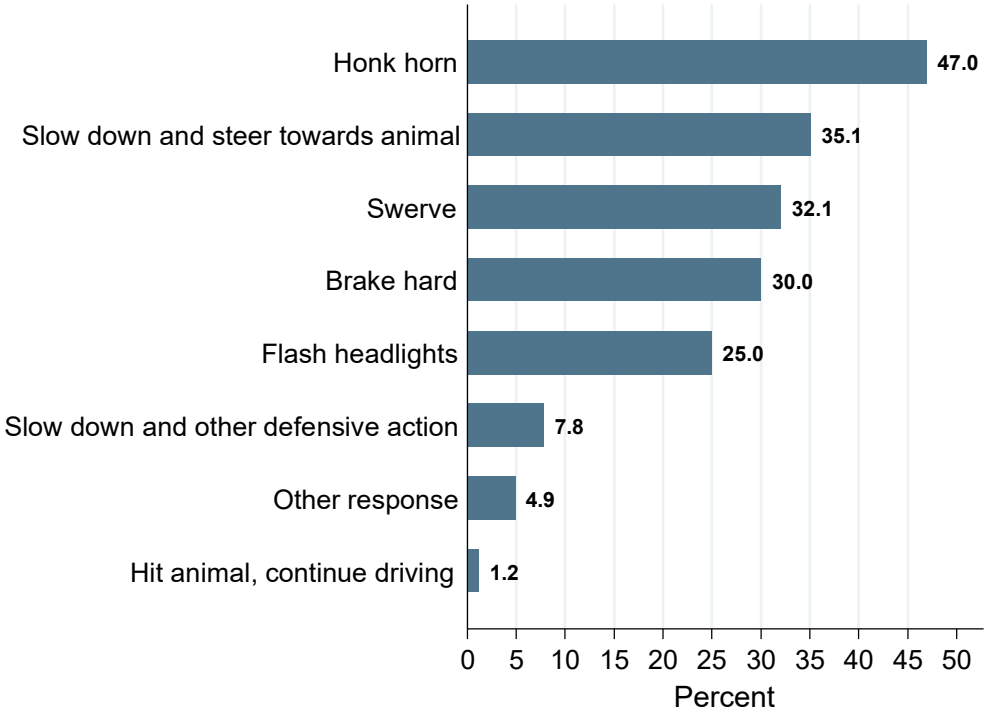
How do Canadians think drivers should respond to wildlife on the road (i.e., driver knowledge)?

Canadians were asked how they think they should react to a wild animal suddenly blocking their lane of traffic while traveling on a highway. They were provided five options representing a combination of common and recommended reactions (ie., honk horn, flash headlights, brake hard, swerve to avoid the animal, and slow down and steer towards the animal) as well as a sixth option that allowed on open-ended response. Responses to the open-ended questions were reviewed and either re-coded into one of the existing five responses if they matched or into two new categories which were created based on the most common open-ended responses, as well as an 'other responses' category. The two new categories were 'slow down and other defensive action' and 'hit animal, continue driving', whereas responses that were

too infrequent to categorize (e.g., turn on hazard lights) were included in 'other responses'. Respondents were allowed to choose as many responses as they deemed applicable.

The most frequent response among Canadians (see Figure 4) was to honk the horn (47.0%) followed by slow down and steer towards the animal (35.1%), swerve (32.1%), brake hard (30.0%), flash headlights (25.0%), slow down and other defensive action (7.8%), other response (4.9%) and hit animal, continue driving (1.2%).

Figure 4: How Canadians think they should respond to wildlife on the road



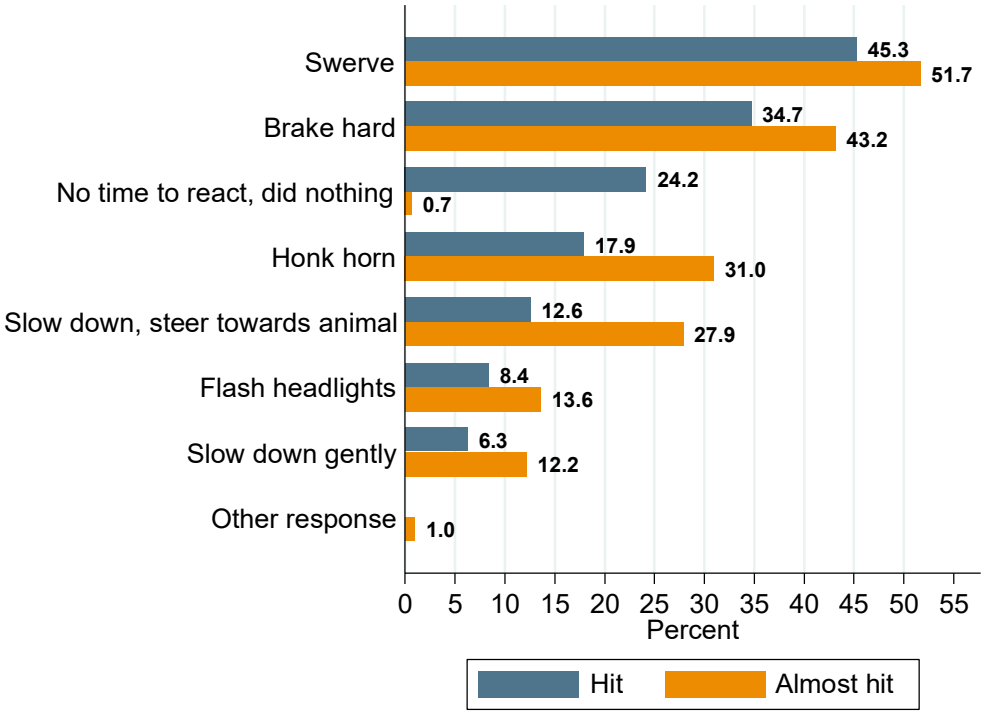
Honking the horn, similar to flashing headlights, is a common and relatively simple method used to warn other road users such as pedestrians, thus it is not surprising that nearly half of all respondents reported using this action to scare animals. At the same time, the unpredictable nature of animals means that drivers must exercise caution when using this method since honking may cause animals to run towards the vehicle, into the pathway of other road users, or not react at all and thus continue to pose a danger. Wildlife do not necessarily recognize that horns signal danger. Furthermore, drivers who remove their hands from the wheel during an emergency road situation may unintentionally lose control of the vehicle. Public education must ensure that drivers are aware of these potential unintended negative consequences that could result from honking.

Next, although slightly more Canadians agreed that drivers should slow down and steer towards the animal (35.1%) as opposed to the next response, swerving (32.1%), the difference between the two was not significant. This suggests that drivers are just as likely to perform the safest road response as they are likely to perform the most dangerous response. Drivers clearly have conflicting beliefs and can benefit from receiving clear and accurate information and education about the safest responses.

How do drivers respond to hitting or almost hitting animals on the road? Respondents who indicated that they had hit or almost hit an animal were asked what type of actions they used to try and avoid a collision. They were provided the same options for a response as mentioned above regarding what drivers should do as well as a sixth option that allowed an open-ended response. Open-ended responses were re-coded into existing responses or into two new categories based on the most common open-ended responses according to the same methodology as described above. The new categories were 'slow down gently' and 'no time to react/did nothing', as well as an 'other responses' category.

With the exception of one response (i.e., 'no time to react/did nothing') driver responses to animals on the road ranked similarly regardless of whether respondents reported hitting or almost hitting an animal (see Figure 5). More specifically, the most frequently reported driver response was to swerve (45.3% among those who hit wildlife; and 51.7% among those who almost hit wildlife). The next most frequent was to brake hard (34.7% who hit wildlife and 43.2% who almost hit wildlife), honk the horn (17.9% hit and 31.0% almost hit), slow down and steer towards the animal (12.6% hit and 27.9% almost hit), flash headlights (8.4% hit and 13.6% almost hit), slow down gently (6.3% hit and 12.2% almost hit), and other response (0.0% hit and 1.0% almost hit). Among the drivers who reported that they had no time to react, there was a significantly higher percentage who hit wildlife (24.2%) in comparison to those who almost hit wildlife (0.7%). The extreme differences regarding the no time to react category reflects that those who almost hit wildlife typically would have had time to respond and were therefore able to avoid the animal in comparison to those who hit the animal.

Figure 5: Driver responses to hitting or almost hitting wildlife on the road



The results were further analyzed to determine if there were any significant differences between hitting and almost hitting wildlife for each behaviour. Three behaviours, slow down and steer towards animal ($p<0.01$), honk horn ($p<0.05$), and no time to react ($p<0.01$) revealed significant differences between hitting and almost hitting an animal. This may suggest that drivers who slow down and steer towards the animal, as well as drivers who honk the horn, are significantly less likely to hit the animal. In contrast, all other results and in particular swerving, showed no significant difference and suggests that they are not beneficial to avoid a collision with wildlife.

Given these results, it is concerning that the recommended response, slow down and steer towards the animal, was employed by drivers much less often both in general and in relation to other driver responses. Equally concerning was that the most frequent response by approximately half of drivers was to swerve. Given the dangers associated with swerving, drivers may require more education about safe responses and may need to practice visualizing the proper response in order to avoid automatic avoidance behaviours.

What characteristics are associated with driver responses to wildlife on the road? Data were analyzed to determine if there were any characteristics associated with respondents and what they think they should do if they encountered wildlife. Data were also analyzed to determine if there were any characteristics associated with those who actually hit or almost hit an animal. Characteristics included age, sex, kilometres driven, urban/rural location, and whether or not the respondent had been previously injured in a collision. Only significant results are reported.

Characteristics associated with drivers and what they think they should do (knowledge) if they encounter wildlife.

- The odds of Canadians thinking that drivers should flash headlights increased by 58.7% ($p<0.05$) if they also reported previously being injured in a collision.
- The odds of Canadians who thought drivers should brake gently increased by 5.4% ($p<0.05$) for every 500 kilometres driven.

Characteristics of hitting wildlife.

- For Canadians, the odds of hitting an animal decreased by 19.7% for every 10 year increase in age; however, the odds increased by 6.0% for every 500 km driven and by 200.9% if the driver lived in a rural area ($p<0.05$).
- Among only drivers who reported hitting an animal, if the respondent lived in an urban area, the odds of swerving increased 296.9% and if the respondent lived in a rural area, the odds of braking hard increased 200.9% ($p<0.05$).

Characteristics of almost hitting wildlife.

- For Canadians, the odds of almost hitting an animal decreased by 12.2% for every 10 year increase in age; however, the odds increased 123.4% if the respondent lived in a rural area ($p<0.05$).
- Among only drivers who reported almost hitting an animal, in terms of sex, the odds of swerving were 126.0% greater for males versus females; and, for every 500 kilometres driven the odds of respondents slowing down gently increased by 12.7% ($p<0.05$).

Among Canadians who reported encountering wildlife, the above results revealed that generally speaking as one ages the odds of hitting or almost hitting wildlife decreased over time. This may suggest that more experienced drivers are better able to avoid colliding with wildlife. Despite controlling for factors such as kilometres driven and urban versus rural driving, it is also possible that as drivers age, they may not drive as much as younger drivers, may not drive as frequently in areas where wildlife are present, or they may use other modes of transportation to reach destinations (e.g., fly). Unsurprisingly, the results also revealed that respondents who lived in rural environments were significantly more likely to encounter wildlife, which corresponds to greater exposure to wildlife in rural areas.

In contrast, no characteristic appeared to be consistently associated with how drivers reported actually responding to, or how they thought drivers should respond to (knowledge), wildlife on the road. For instance, increased driver experience, whether according to age (older drivers), more kilometres driven, or exposure to wildlife (rural drivers) did not increase the odds of drivers reporting that they slowed down and steered towards wildlife or that drivers think they should slow down and steer towards wildlife blocking the pathway of the vehicle. Likewise, these experience-type characteristics did not decrease the chances of respondents reporting that they swerved or that they think drivers should swerve. This may mean that although driver skill could be improving over time as evidenced by the decreasing numbers of WVCs according to age and rural drivers (see above), driver responses and driver knowledge regarding how to respond safely to wildlife on the road may not be improving. For practitioners and the public, this means that education about this issue is needed for drivers of all demographics in equal measure.

Study limitations. There were some limitations to this study. Respondents who indicated that they hit or almost hit more than one animal were asked to only describe details about their most recent encounter. For this reason, data do not reflect all previous encounters with wildlife when discussing animal type, light conditions, and season. Furthermore, it was not possible to collect specific details related to exact times, dates, and locations of collisions or near collisions. Given that respondents provided information based on recalled experiences, it was also possible that some incorrectly remembered the conditions under which they hit or almost hit wildlife. Finally, data were not collected on whether respondents hit other road users or road hazards due to a collision or near collision with wildlife.

Concluding remarks. The results of this first effort to gain greater insight into how Canadians actually respond and how Canadians think they should respond to wildlife on the road has been revealing. Although this study represented a first step towards improving data collection on WVCs, there were several limitations to it as discussed above. As such, additional research and more detailed questionnaires are needed. Nonetheless, the results are consistent with the findings of other research studies. In particular, drivers reported hitting or almost hitting small animals and deer most frequently. Both of these situations are dangerous because drivers should not swerve for either animal type, since doing so places themselves and other road users at risk.

Equally important, the survey revealed that only one-third of Canadians think that the safest response to wildlife in the pathway of their vehicle is to slow down and steer straight and, just as concerning, approximately the same proportion of Canadians think they should swerve. This illustrates misconceptions and lack of knowledge among Canadian drivers about what to do when they encounter animals on the road. Although focusing on improving mitigation measures and improving road design is important to reduce WVCs, the survey revealed a clear need to improve driver education about responding to wildlife, which could have a more immediate and lasting impact on the extent of WVCs.

In response to this need, TIRF created the Wildlife Roadsharing Resource Centre (WRRC, www.widlliferoadsharing.tirf.org) in partnership with State Farm Canada. The WRRC provides evidenced-based research and expert advice on road safety related to WVCs, dispells misconceptions, and provides various online resources to help improve public knowledge. Additionally, the WRRC is a resource for researchers and practitioners, providing sources of data, advantages and disadvantages of various mitigation measures, summaries of key research and other downloadable resources.

About the poll. These results are based on the RSM, an annual public opinion poll developed and conducted by TIRF. A total of 1,031 Canadians completed the poll in October and November of 2014. Results can be considered accurate within plus or minus 3.1%, 19 times out of 20. The data were stratified and weighted by sex, age, and province. The majority of the questions were answered using a scale from one to six where six indicated high agreement, concern, or support and one indicated low agreement, concern, or support. All respondents completed the survey on-line.

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