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ROAD SAFETY IN 170 LOW-, MIDDLE-, AND HIGH-INCOME COUNTRIES

MICHAEL SIVAK
BRANDON SCHOETTLE

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Michael Sivak
Brandon Schoettle

The University of Michigan
Transportation Research Institute
Ann Arbor, Michigan 48109-2150
U.S.A.

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16. Abstract

Earlier this year, the World Health Organization published a comprehensive assessment of road safety in the individual countries of the world (WHO, 2013). The present study used the WHO data for individual countries but focused on differences based on the level of development. The goal was to identify relevant commonalities that may assist in the creation of road-safety policies common to countries at a similar level of development. The countries were divided into three groups according to the level of gross national income per capita, and these income-level groups were the primary units of interest. The results presented here focus on the differences by income level both in motor-vehicle fatality rates and in a variety of factors associated with road safety.

The results indicate that the fatality rate per vehicle decreases as income level increases, while the fatality rate per person is an inverted-U-shaped function of income level. Percentage of pedestrian fatalities out of all fatalities decreases as income level increases. Income-level effects were also found for 31 aspects related to institutional framework, safer roads and mobility, safer vehicles, safer road users, and post-crash care.

The report also includes an exploratory regression of the fatality rate per vehicle.

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Introduction

Earlier this year, the World Health Organization published a comprehensive assessment of road safety in the individual countries of the world (WHO, 2013). For each country, a one-page tabular summary highlighted the following relevant aspects: institutional framework, safer roads and mobility, safer vehicles, safer road users, and post-crash care.

The present study uses the WHO data for individual countries but focuses on differences based on the level of development. The goal was to identify relevant commonalities that may assist in the creation of road-safety policies common to countries at a similar level of development. Thus, countries were divided into three groups according to the level of gross national income per capita, and these income-level groups were the primary units of interest.

Method

Data for individual countries in digital form was obtained directly from WHO. Most of the data were for 2010. Two *inclusion* criteria were imposed on the countries: a nonzero number of fatalities in the reporting year (so that fatality rates could be calculated), and a population of at least 100,000 (to avoid large year-to-year deviations possible with small numbers of fatalities). As a result, the analysis was based on 170 countries.

All road safety aspects in the WHO publication that appeared to be consistently reported for all countries were examined for differences between income-level categories. (An example of a variable that was *not* consistently reported by all countries is the breakdown of all vehicles into vehicle groups.)

The three income levels employed followed the WHO categorization by gross national income per person (WHO, 2013): low (less than $1,006), middle ($1,006 to $12,275), and high (more than $12,275).

The Results section will focus on significant differences by income level. The exposition will use the same categorization of relevant aspects as in the original WHO publication: institutional framework, safer roads and mobility, safer vehicles, safer road users, and post-crash care. A total of 31 significant differences for aspects in these categories will be presented.

An additional category, basic rates, will present a motorization rate and three basic fatality rates that were calculated using the WHO data. The fatality rates are based on the reported fatalities that WHO adjusted for the 30-day definition of road traffic death (*not* on the modeled deaths that WHO also provides based on a regression model).

The WHO publication includes a variety of estimates (including estimates of effectiveness of several laws related to road safety). These estimates were made by safety experts in the respective countries.

Results

Basic rates

As expected, the number of vehicles per population increases as income level increases (Table 1). On average, there are 36 vehicles per thousand people in low-income countries. The corresponding average in high-income countries is 580 vehicles. (WHO did not include the number of vehicles for four of the 170 countries examined in this study.)

Table 1
Vehicles per thousand people.

Vehicles per thousand people	Income level (number of countries)			
	Low (32)	Middle (88)	High (46)	*Total (166)*
Mean	36	173	580	*260*
95% confidence interval for mean	18 – 54	145 – 202	515 – 646	*220 - 299*

The fatality rate per vehicle decreases as income level increases (Table 2). Specifically, the average rate for low-income countries is 19 times greater than for high-income countries.

Table 2
Fatality rate per million vehicles.

Fatalities per million vehicles	Income level (number of countries)			
	Low (32)	Middle (88)	High (46)	*Total (166)*
Mean	6,040	2,165	313	*2,399*
95% confidence interval for mean	3,238 – 8,842	1,094 – 3,236	41 – 585	*1,575 – 3,222*

In contrast to the fatality rate per vehicle, the fatality rate per person is an inverted-U-shaped function of income level (Table 3), with the highest rate for middle-income countries.

Table 3
Fatality rate per million persons.

Fatalities per one million persons	Income level (number of countries)			
	Low (32)	Middle (92)	High (46)	*Total (170)*
Mean	70.3	126.3	81.2	*103.5*
95% confidence interval for mean	50.7 – 90.0	112.9 – 139.6	65.9 – 96.4	*93.8 – 113.2*

Percentage of pedestrian fatalities out of all fatalities decreases as income level increases (Table 4). For low-income countries the average is 34.8%, while for high-income countries it is 20.5%.

Table 4
Percentage of pedestrian fatalities out of all fatalities.

Percentage of pedestrian fatalities	Income level (number of countries)			
	Low (14)	Middle (69)	High (41)	*Total (124)*
Mean	34.8	30.9	20.5	*27.9*
95% confidence interval for mean	24.9 – 44.7	28.0 – 33.7	17.7 – 23.4	*25.6 – 30.2*

Institutional framework

The likelihood of having a national road-safety strategy increases with income level (Table 5). Such a strategy exists in 59.4% of low-income countries and 91.3% of high-income countries.

Table 5
National road-safety strategy.

National road-safety strategy	Income level (number of countries)			
	Low (32)	Middle (92)	High (46)	*Total (170)*
Yes	59.4	80.4	91.3	*79.4*
No	40.6	19.6	8.7	*20.6*

Safer vehicles

The probability that a country applies the UN World Forum for Harmonization of Vehicle Regulations increases with income level (Table 6). Only 3.6% of low-income countries apply these regulations, compared to 68.3% of high-income countries.

Table 6
The UN World Forum for Harmonization of Vehicle Regulations.

UN World Forum applied	Income level (number of countries)			
	Low (28)	Middle (78)	High (41)	*Total (147)*
Yes	3.6	28.2	68.3	*34.7*
No	96.4	71.8	31.7	*65.3*

The likelihood that a country has a new-car assessment program increases with income level (Table 7). The percentages of low- and high-income countries with such a program are 14.3% and 35.0%, respectively. The percentage of countries requiring the installation of both front and rear seat belts in new cars increases with income level (Table 8), as does the percentage of countries requiring the installation of airbags (Table 9). For seat belts, these percentages are 45.2% for low-income countries and 97.8% for high-income countries, while for airbags they are 9.7% and 33.3%, respectively.

Table 7
New-car assessment program (NCAP).

NCAP applied	Income level (number of countries)			
	Low (28)	Middle (76)	High (40)	*Total (144)*
Yes	14.3	15.8	35.0	*20.8*
No	85.7	84.2	65.0	*79.2*

Table 8
Front and rear seat belts in new cars.

Front and rear seat belts required	Income level (number of countries)			
	Low (31)	Middle (91)	High (46)	*Total (168)*
Yes	45.2	69.2	97.8	*72.6*
No	54.8	30.8	2.2	*27.4*

Table 9
Airbags in new cars.

Airbags required	Income level (number of countries)			
	Low (31)	Middle (89)	High (45)	*Total (165)*
Yes	9.7	16.9	33.3	*20.0*
No	90.3	83.1	66.7	*80.0*

For electronic stability control, low-income countries have similar installation rates as middle-income countries (6.5% vs. 5.9%), with both of these groups having lower rates than high-income countries (21.7%) (Table 10).

Table 10
Electronic stability control (ESC) in new cars.

ESC required	Income level (number of countries)			
	Low (31)	Middle (85)	High (46)	*Total (162)*
Yes	6.5	5.9	21.7	*10.5*
No	93.5	94.1	78.3	*89.5*

Safer road users

The percentage of countries with a national demerit/points penalty system in place increases with income level (Table 11). The average percentages for low- and high-income countries are 31.3% and 73.9%, respectively.

Table 11
Demerit/points penalty system.

Penalty system in place	Income level (number of countries)			
	Low (32)	Middle (91)	High (46)	*Total (169)*
Yes, national	31.3	50.5	73.9	*53.3*
Yes, subnational	0	0	2.2	*0.6*
No	68.8	49.5	23.9	*46.2*

Maximum speed limits on rural roads (Table 12) tend to be *lower* in low- and middle-income countries (averaging 67 km/h and 69 km/h, respectively) than in high-income countries (81 km/h). Analogously, maximum speed limits near schools (Table 13) tend to be *lower* in low- and middle-income countries (averaging 34 km/h in both) than in high-income countries (41 km/h).

The estimated effectiveness of speed-limit enforcement increases with increasing income level (Table 14).

Table 12
Maximum speed limit on rural roads (km/h).

Speed limit on rural roads	Income level (number of countries)			
	Low (26)	Middle (79)	High (41)	*Total (146)*
Mean	67	69	81	*72*
95% confidence interval for mean	59 – 75	65 – 74	76 – 87	*69 - 76*

Table 13
Maximum speed limit near schools (km/h).

Speed limit near schools	Income level (number of countries)			
	Low (24)	Middle (72)	High (29)	*Total (125)*
Mean	34	34	41	*36*
95% confidence interval for mean	29 – 39	31 – 37	37 – 45	*33 - 38*

Table 14
Effectiveness of speed-limit enforcement (0 = lowest, 10 = highest).

Effectiveness of speed-limit enforcement	Income level (number of countries)			
	Low (32)	Middle (91)	High (42)	*Total (165)*
Mean	3.8	4.9	6.4	*5.1*
95% confidence interval for mean	3.1 – 4.5	4.5 – 5.4	5.8 – 6.9	*4.7 – 5.4*

The likelihood that a country would define drunk driving by blood alcohol concentration (BAC) increases with income level (Table 15). For low-income countries, the corresponding percentage is 62.1%, while for high-income countries it is 93.5%. A similar pattern is present for the percentage of countries with random breath testing and/or police checkpoints (Table 16), with 51.9% of low-income countries having such a system, compared to 87.0% of high-income countries.

The estimated effectiveness of BAC enforcement increases with increasing income (Table 17).

Table 15
Drunk driving defined by blood alcohol concentration (BAC).

BAC limit in place	Income level (number of countries)			
	Low (29)	Middle (89)	High (46)	*Total (164)*
Yes	62.1	85.4	93.5	*83.5*
No	37.9	14.6	6.5	*16.5*

Table 16
Random breath testing and/or police checkpoints.

Random breath testing in place	Income level (number of countries)			
	Low (27)	Middle (86)	High (46)	*Total (159)*
Yes	51.9	82.6	87.0	*78.6*
No	48.1	17.4	13.0	*21.4*

Table 17
Effectiveness of BAC enforcement (0 = lowest, 10 = highest).

Effectiveness of BAC enforcement	Income level (number of countries)			
	Low (29)	Middle (90)	High (42)	*Total (161)*
Mean	3.3	5.2	6.6	*5.2*
95% confidence interval for mean	2.6 – 4.1	4.7 – 5.7	6.0 – 7.2	*4.9 – 5.6*

As is evident from Table 18, a lower percentage of low-income countries have national seat-belt laws than middle- or high-income countries (68.8% vs. 95.7% and 93.5%). The likelihood that such a law applies to all occupants increases with income level (Table 19), as does the estimated effectiveness of its enforcement (Table 20).

Table 18
National seat-belt law.

National seat-belt law	Income level (number of countries)			
	Low (32)	Middle (92)	High (46)	*Total (170)*
Yes, national	68.8	95.7	93.5	*90.0*
Yes, subnational	0	0	6.5	*1.8*
No	31.3	4.3	0	*8.2*

Table 19
Applicability of seat-belt law.

Law applies to all occupants	Income level (number of countries)			
	Low (22)	Middle (88)	High (45)	*Total (155)*
Yes	54.5	63.6	84.4	*68.4*
No	45.5	36.4	15.6	*31.6*

Table 20
Effectiveness of seat-belt-law enforcement (0 = lowest, 10 = highest).

Effectiveness of seat-belt-law enforcement	Income level (number of countries)			
	Low (22)	Middle (87)	High (42)	*Total (151)*
Mean	4.8	5.8	6.8	*5.9*
95% confidence interval for mean	3.6 – 5.9	5.3 – 6.2	6.2 – 7.4	*5.6 – 6.3*

The data in Table 21 indicate that the percentage of countries with a national child-restraint law increases with increasing income level. There are 29.0% of low-income countries with such a law, in contrast to 80.4% of high-income countries. The estimated effectiveness of enforcement of such laws increases with increasing income level (Table 22).

Table 21
National child-restraint law.

Child-restraint law	Income level (number of countries)			
	Low (31)	Middle (88)	High (46)	*Total (165)*
Yes, national	29.0	44.3	80.4	*51.5*
Yes, subnational	3.2	2.3	6.5	*3.6*
No	67.7	53.4	13.0	*44.8*

Table 22
Effectiveness of child-restraint-law enforcement (0 = lowest, 10 = highest).

Effectiveness of child-restraint-law enforcement	Income level (number of countries)			
	Low (8)	Middle (37)	High (36)	*Total (81)*
Mean	1.1	3.8	6.4	*4.7*
95% confidence interval for mean	0.1 – 2.2	2.9 – 4.8	5.7 – 7.0	*4.1 – 5.2*

National helmet laws exist in fewer low-income countries (87.5%) than in middle- or high-income countries (96.7% and 93.5%) (Table 23). The estimated effectiveness of enforcement of such laws increases with increasing income level (Table 24). The existence of helmet-performance standards (Table 25) increases as income level increases (35.7% in low-income countries vs. 88.6% in high-income countries).

Table 23
National helmet law.

National helmet law	Income level (number of countries)			
	Low (32)	Middle (92)	High (46)	*Total (170)*
Yes, national	87.5	96.7	93.5	*94.1*
Yes, subnational	0	2.2	6.5	*2.9*
No	12.5	1.1	0	*2.9*

Table 24
Effectiveness of helmet-wearing-law enforcement (0 = lowest, 10 = highest).

Effectiveness of helmet-wearing law	Income level (number of countries)			
	Low (28)	Middle (90)	High (42)	*Total (160)*
Mean	3.8	5.7	7.8	*5.9*
95% confidence interval for mean	2.9 – 4.6	5.3 – 6.2	7.3 – 8.3	*5.5 – 6.3*

Table 25
Helmet-performance standard.

Helmet-performance standard	Income level (number of countries)			
	Low (28)	Middle (86)	High (44)	*Total (158)*
Yes	35.7	50.0	88.6	*58.2*
No	64.3	50.0	11.4	*41.8*

The percentage of countries with a national law on mobile-phone use while driving increases with income level (Table 26). The corresponding percentages for low- and high-income countries are 56.3% and 87.0%, respectively. Availability of data on mobile-phone use while driving increases with income level (Table 27). For low-income countries, this percentage is 23.3%, while for high-income countries it is 63.6%.

Table 26
Law on mobile phone use while driving.

Mobile-phone law	Income level (number of countries)			
	Low (32)	Middle (91)	High (46)	*Total (169)*
Yes, national	56.3	78.0	87.0	*76.3*
Yes, subnational	3.1	4.4	6.5	*4.7*
No	40.6	17.6	6.5	*18.9*

Table 27
Data on mobile-phone use while driving.

Availability of mobile-phone data	Income level (number of countries)			
	Low (30)	Middle (90)	High (44)	*Total (164)*
Yes	23.3	33.3	63.6	*39.6*
No	76.7	66.7	36.4	*60.4*

Safer roads and mobility

The percentage of countries with a national policy to promote walking or cycling increases with income level (Table 28). The corresponding percentages for low- and high-income countries are 6.3% and 60.0%, respectively. A similar trend is present for the existence of a national policy to encourage investment in public transport (Table 29). The corresponding percentages for low- and high-income countries are 31.3% and 71.7%, respectively.

Table 28
National policy to promote walking or cycling.

Existence of policy	Income level (number of countries)			
	Low (32)	Middle (89)	High (45)	*Total (166)*
Yes, national	6.3	13.5	60.0	*24.7*
Yes, subnational	0	21.3	11.1	*14.5*
No	93.8	65.2	28.9	*60.8*

Table 29
National policy to encourage investment in public transport.

Existence of policy	Income level (number of countries)			
	Low (32)	Middle (86)	High (46)	*Total (164)*
Yes, national	31.3	48.8	71.7	*51.8*
Yes, subnational	12.5	11.6	15.2	*12.8*
No	56.3	39.5	13.0	*35.4*

Low- and middle-income countries have a lower likelihood of having a national policy to separate road users to protect vulnerable road users (22.6% and 16.9%) than high-income countries (46.7%) (Table 30).

Table 30
National policy to separate road users to protect vulnerable road users.

Existence of policy	Income level (number of countries)			
	Low (31)	Middle (89)	High (45)	*Total (165)*
Yes, national	22.6	16.9	46.7	*26.1*
Yes, subnational	9.7	21.3	24.4	*20.0*
No	67.7	61.8	28.9	*53.9*

Post-crash care

The probability of having a vital registration system increases with income level (Table 31). Such systems are present in 59.4% of low-income countries and 100% of high-income countries.

Table 31
Vital registration system.

Vital registration system	Income level (number of countries)			
	Low (32)	Middle (92)	High (45)	*Total (169)*
Yes	59.4	91.3	100.0	*87.6*
No	40.6	8.7	0	*12.4*

Availability of a universal emergency telephone number increases with income level (Table 32). Such access numbers (either single or multiple) are available in 46.7% of low-income countries and 100% of high-income countries.

Table 32
Universal emergency access telephone number.

Emergency access number	Income level (number of countries)			
	Low (30)	Middle (92)	High (46)	*Total (168)*
Yes, national	30.0	57.6	87.0	*60.7*
Yes, multiple	16.7	30.4	13.0	*23.2*
Yes, subnational	13.3	5.4	0	*5.4*
None	40.0	6.5	0	*10.7*

The estimated percentage of seriously injured patients transported by ambulance increases with income level (Table 33). No ambulance service is available in 12.9% of low-income countries; in contrast, 100% of high-income countries have such service. Furthermore, in 6.5% of low-income countries at least 75% of seriously injured patients are transported by ambulance, while the corresponding percentage in high-income countries is 50.0%.

Table 33
Percentage of seriously injured patents transported by ambulance.

Percentage transported	Income level (number of countries)			
	Low (31)	Middle (84)	High (42)	*Total (157)*
≤10	61.3	26.2	7.1	*28.0*
11-49	19.4	20.2	19.0	*19.7*
50-74	0	15.5	23.8	*14.6*
≥75	6.5	34.5	50.0	*33.1*
No service	12.9	3.6	0	*4.5*

The availability of training for emergency medicine for both doctors and nurses increases with income level. Such training for doctors is present for 51.9% of low-income countries and 82.2% of high-income countries (Table 34). The corresponding percentages for training for nurses are 26.7% and 76.1% (Table 35).

Table 34
Training for emergency medicine for doctors.

Training available	Income level (number of countries)			
	Low (27)	Middle (89)	High (45)	*Total (161)*
Yes	51.9	75.3	82.2	*73.2*
No	48.1	24.7	17.8	*26.7*

Table 35
Training for emergency medicine for nurses.

Training available	Income level (number of countries)			
	Low (30)	Middle (88)	High (46)	*Total (164)*
Yes	26.7	53.4	76.1	*54.9*
No	73.3	46.6	23.9	*45.1*

Discussion and Conclusions

Basic rates

Three expected patterns were obtained as a function of increasing income level: increasing number of vehicles per population (Table 1), decreasing number of fatalities per vehicle (Table 2), and an inverted-U-shaped function of fatalities per population (Table 3).

The latter finding—a non-monotonic Kuznets curve of fatalities per population as a function of income level—is consistent with other studies (e.g., McManus, 2007). The reason for the non-monotonic aspect of this relationship becomes evident when fatalities per population (F/P) are decomposed into vehicles per population (V/P) multiplied by fatalities per vehicle (F/V). The reason for the initial increase of F/P with income is that, at lower income levels, the increase in V/P is steeper than the decrease in F/V. However, at higher income levels, the increase in V/P is shallower than the decrease in F/V.

Another way of restating the above is that, at low-income levels, the increase in motorization is steeper than the improvements in road safety per vehicle. Conversely, at high-income levels, the increase in motorization is shallower (approaching saturation) than the improvements in road safety per vehicle.

Percentage of pedestrian fatalities out of all fatalities decreases as income level increases (Table 4). This trend is consistent with previous findings (e.g., Downing, Sayer, and Zaher-ul-Islam, 1993).

Institutional framework

Low-income countries are less likely to have a national road-safety strategy than middle- and high-income countries (Table 5).

Safer vehicles

In comparison to middle- and high-income countries, low-income countries are less likely to do the following: apply the UN Forum for Harmonization of Vehicle Regulations (Table 6), have a new-car assessment program (Table 7), and require that new cars have front and rear seat belts (Table 8), airbags (Table 9), and electronic stability control (Table 10). (For electronic stability control—a relatively new

technology—low-income countries have similar installation rates as middle-income countries, with both of these groups having lower rates than high-income countries.)

Safer road users

Fewer low-income countries have a demerit/points penalty system in place than middle- and high-income countries (Table 11).

Low- and middle-income countries tend to have *lower* maximum speed limits both on rural roads (Table 12) and near schools (Table 13). However, the estimated effectiveness of speed-limit enforcement increases with increasing income-level (Table 14).

The likelihood that a country defines drunk driving by BAC increases with income level (Table 15), as does the use of random breath testing and/or police check points (Table 16). The estimated effectiveness of BAC enforcement increases with increasing income level (Table 17).

Fewer low-income countries have a national seat-belt law than do middle- and high-income countries (Table 18). The likelihood that such a law applies to all occupants and its estimated effectiveness of enforcement both increase with increasing income level (Tables 19 and 20).

The likelihood that a low-income country has a national child-restraint law increases with income level (Table 21), as does the estimated effectiveness of its enforcement (Table 22).

Fewer low-income countries have a national helmet law than do middle- and high-income countries (Table 23). The estimated effectiveness of enforcement of such laws increases with income level (Table 24), as does the existence of a helmet-performance standard (Table 25).

The probability of having a law concerning mobile-phone use while driving increases with income level (Table 26). The availability of data on mobile-phone use while driving increases with income level (Table 27).

Safer roads and mobility

The likelihood that a country has a national policy to promote walking and cycling increases with income level (Table 28), as does the likelihood of having a national policy to encourage investment in public transport (Table 29). Low- and middle-income countries are less likely than high-income countries to have a national policy to separate road users to protect vulnerable road users (Table 30).

Post-crash care

As income level increases, so does the probability of having a vital registration system (Table 31) and a universal emergency access phone number (Table 32).

The estimated percentage of seriously injured patients transported by ambulance increases with income level (Table 33).

The availability of training for emergency medicine for doctors and nurses increases with income level (Table 34 and 35).

Predicting the fatality rate per vehicle

Correlational analysis. Pairwise correlations were computed between the fatality rate per vehicle and 30 variables that varied significantly as a function of income level. These variables are described in Tables 5 through 32, and Tables 34 and 35. (Percentage of seriously injured patients transported by ambulance [Table 33] was not included because the way this variable was coded precluded its use in a correlational analysis.) Nineteen pairwise correlation coefficients (out of 30) were statistically significant, with the highest coefficient for the existence of a vital registration system ($r = .35$).

Factor analysis. To reduce the number of variables to be entered in a regression analysis to follow, a factor analysis was performed on the variables that were significantly correlated with the fatality rate per vehicle (from the above correlational analysis) *and* that had data for at least 160 countries. (The fatality rate per vehicle—the dependent variable in the regression to follow—was available for 166 countries.) Because of these two constraints, only 14 variables (out of the original 30 candidate variables) were entered into this factor analysis. The analysis yielded three factors, which accounted for a total of 50.0% of the variance.

Regression analysis. This analysis was performed as an illustration of an approach to guide future research. In this regression, the dependent variable was the fatality rate per vehicle. There were three predictor variables, one each from the three factors in the above factor analysis. For each factor, the variable that was entered into the regression was the one with the highest loading (positive or negative). The selected variables were: effectiveness of speed-limit enforcement, existence of training in emergency medicine for doctors, and existence of a national seat-belt law. A total of 153 countries had data for all three of these variables.

The results indicate that the regression model was statistically significant ($F_{2,152}$ = 9.0, $p < .001$). The model accounted for 11% of the variance in the fatality rate per vehicle. Two of the three predictor variables entered into the regression were significant: effectiveness of speed-limit enforcement and existence of a national seat-belt law. Both effects were in the expected directions.

Important note. The specific results of this regression are of a limited value and need to be interpreted with great caution. The reasons for the caution are as follows: Several variables (5 out of 19) that differed significantly by income level and were correlated to the fatality rate per vehicle were not among the possible candidates for the regression because the data for these variables were available for fewer countries than our arbitrary minimum of 160 countries. Furthermore, even with this minimum, only 153 countries (of the 170 countries examined) had data for all entered variables. (These concerns are in addition to the fact that regression analysis can be used only to explore associations, as opposed to causal links.) Consequently, the primary value of this regression (and of the associated correlational analysis and factor analysis) is in providing a conceptual framework to be considered for use in future research once a larger set of potentially relevant data is available for more countries.

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