ROAD SAFETY IN THE INDIVIDUAL U.S. STATES: CURRENT STATUS AND RECENT CHANGES

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16. Abstract

Since 2005, road safety in the U.S. has improved substantially. Of interest in this study was road safety in the individual U.S. states and the District of Columbia, both in terms of the current status and recent changes. The analysis included the use of two primary measures: fatality rate per distance driven, and fatality rate per population. The data for two years were analyzed: 2012 (the latest available year) and 2005.

The results indicate that the *fatality rate per distance driven* varies greatly. In 2012, the lowest fatality rates per 1 billion miles were in the District of Columbia (4.20), Massachusetts (6.24), and Minnesota (6.93). The highest rates were in West Virginia (17.63), South Carolina (17.60), and Montana (17.25). Similarly, the percentage change in this rate between 2005 and 2012 exhibited a wide range. On one extreme were the District of Columbia (-67.5%), Nevada (-48.0%), and Idaho (-39.0%). On the other extreme were Vermont (+12.7%), North Dakota (+3.8%), and Maine (+2.0%).

The variability of the *fatality rate per population* is even greater than that of the fatality rate per distance driven. In 2012, the lowest fatality rates per 100 thousand people were in the District of Columbia (2.37), Massachusetts (5.25), and New York (5.97). The highest rates were in North Dakota (24.30), Wyoming (21.34), and Montana (20.40). As was the case for the fatality rate per distance driven, the percentage change between 2005 and 2012 in the fatality rate per population exhibited a wide range. On one extreme were the District of Columbia (-72.8%), Nevada (-47.1%), and Idaho (-40.1%). On the other extreme were North Dakota (+25.8%), Vermont (+4.9%), and Maine (-3.5%).

17. Key Words road safety, individual U.S. states, fatalities per distance driven, fatalities per population, current status, recent changes		18. Distribution Statement Unlimited	
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Introduction

Since 2005, road fatalities in the U.S. have dropped substantially. The data for 2012 show a reduction of 22.7% since 2005 (NHTSA, 2007; 2014). Reductions of similar magnitudes were also achieved for fatalities per distance driven and fatalities per population.

Of interest in this study was road safety in the individual U.S. states, both in terms of the current status and recent changes.[1] The analysis included the use of two primary measures: fatalities per distance driven, and fatalities per population. (Although the fatality rate per distance driven is the most frequent measure of road safety, I argued recently that to place road safety in the broader context of public health requires the use of the fatality rate per population [Sivak, 2014].) In addition, the numbers of fatalities in each state were examined as well. The data for two years were analyzed: 2012 (the latest year available) and 2005 (a recent peak).

Data sources

2012
    NHTSA (2014): fatalities, fatalities per population

    FHWA (2014): distance driven (for calculation of fatalities per distance driven)

2005
    NHTSA (2007): fatalities, fatalities per population

    FHWA (2011): distance driven (for calculation of fatalities per distance driven)

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[1] Although the District of Columbia is not a state, for brevity of exposition I will refer to the fifty states and the District of Columbia as the states.

Results

Current status of road safety

Fatalities. Table 1 presents the number of road fatalities in 2012 in each state in increasing order of fatalities. In Table 1 and in Figure 1, the states are divided into three groups of 17 each according to the number of fatalities (low, medium, and high). The lowest numbers of fatalities (in increasing order) were in the District of Columbia, Alaska, Rhode Island, Vermont, and New Hampshire. The highest numbers of fatalities (in decreasing order) were in Texas, California, Florida, Pennsylvania, and North Carolina.

Fatalities per distance driven. Table 2 shows the fatality rate per distance driven in 2012 in each state. In Table 2 and in Figure 2, the states are divided into three groups of 17 each according to the magnitude of this rate (low, medium, and high). The lowest rate (in the District of Columbia) was 4.2 times lower than the highest rate (in West Virginia).[2] The lowest rates (in increasing order) were in the District of Columbia, Massachusetts, Minnesota, Connecticut, and Washington. The highest rates (in decreasing order) were in West Virginia, South Carolina, Montana, North Dakota, and Arkansas.

Fatalities per population. Table 3 presents the fatality rate per population in 2012 in each state. In Table 3 and in Figure 3, the states are divided into three groups of 17 each according to the magnitude of this rate (low, medium, and high). The lowest rate (in the District of Columbia) was 10.3 times lower than the highest rate (in North Dakota).[3] The lowest rates (in increasing order) were in the District of Columbia, Massachusetts, New York, Rhode Island, and Washington. The highest rates (in decreasing order) were in North Dakota, Wyoming, Montana, Mississippi, and Arkansas.

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[2] If one disregards the District of Columbia because of its solely urban composition, the second lowest rate (in Massachusetts) was 2.8 times lower than the highest rate (in West Virginia).
[3] If one disregards the District of Columbia, the second lowest rate (in Massachusetts) was 4.6 times lower than the highest rate (in North Dakota).

Table 1
Road fatalities in the individual states, 2012 (NHTSA, 2014).

State	Fatalities
District of Columbia	15
Alaska	59
Rhode Island	64
Vermont	77
New Hampshire	108
Delaware	114
Wyoming	123
Hawaii	126
South Dakota	133
Maine	164
North Dakota	170
Idaho	184
Montana	205
Nebraska	212
Utah	217
Connecticut	236
Nevada	258
Oregon	336
West Virginia	339
Massachusetts	349
Iowa	365
New Mexico	365
Minnesota	395
Kansas	405
Washington	444
Colorado	472
Maryland	505
Arkansas	552
Mississippi	582
New Jersey	589
Wisconsin	615
Oklahoma	708
Louisiana	722
Kentucky	746
Virginia	777
Indiana	779
Arizona	825
Missouri	826
South Carolina	863
Alabama	865
Michigan	938
Illinois	956
Tennessee	1,014
Ohio	1,123
New York	1,168
Georgia	1,192
North Carolina	1,292
Pennsylvania	1,310
Florida	2,424
California	2,857
Texas	3,398
U.S.A.	*33,561*

Figure 1. Road fatalities in the individual states, 2012.

Table 2
Fatality rates per distance driven in the individual states, 2012.
(Calculated from information in NHTSA [2014] and FHWA [2014].)

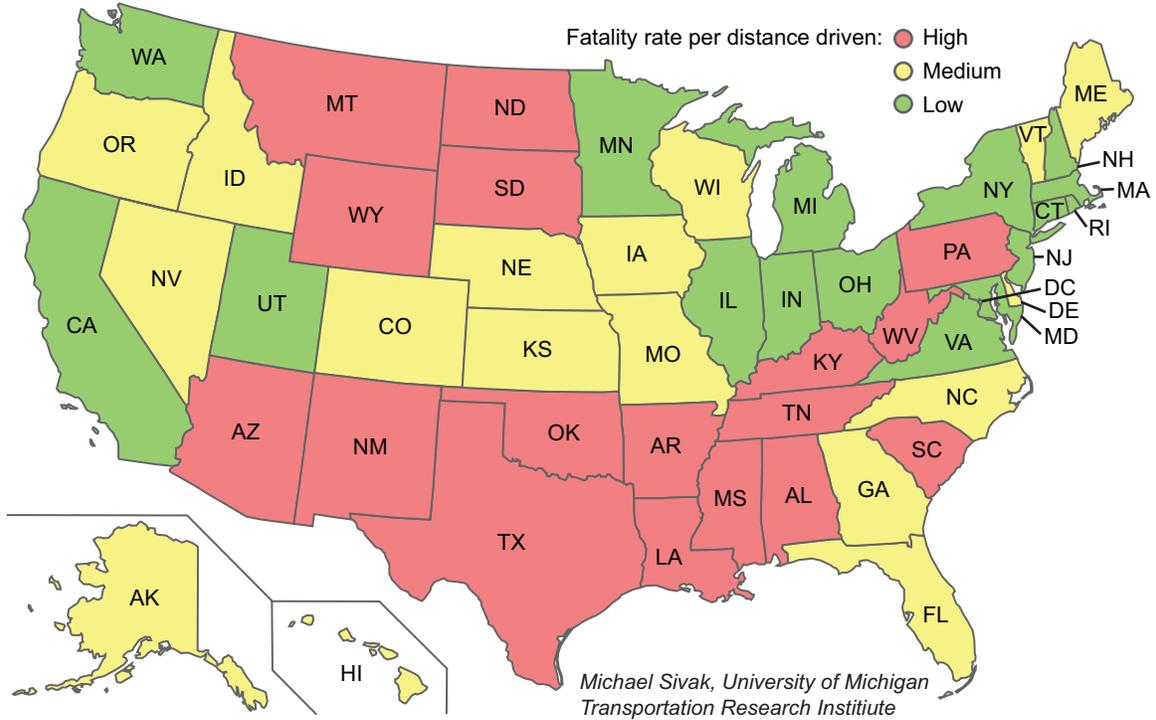| State	Fatality rate per 1 billion miles
District of Columbia	4.20
Massachusetts	6.24
Minnesota	6.93
Connecticut	7.55
Washington	7.82
New Jersey	7.94
Utah	8.18
Rhode Island	8.20
New Hampshire	8.38
California	8.76
Maryland	8.94
New York	9.11
Illinois	9.14
Virginia	9.60
Indiana	9.87
Michigan	9.92
Ohio	9.96
Colorado	10.09
Oregon	10.13
Wisconsin	10.41
Vermont	10.67
Nevada	10.68
Nebraska	11.00
Georgia	11.09
Idaho	11.28
Maine	11.55
Iowa	11.55
Missouri	12.06
North Carolina	12.31
Alaska	12.31
Delaware	12.41
Hawaii	12.54
Florida	12.67
Kansas	13.25
Pennsylvania	13.25
Wyoming	13.27
Alabama	13.32
Arizona	13.72
Tennessee	14.25
New Mexico	14.28
Texas	14.29
South Dakota	14.59
Oklahoma	14.79
Mississippi	15.05
Louisiana	15.40
Kentucky	15.76
Arkansas	16.47
North Dakota	16.86
Montana	17.25
South Carolina	17.60
West Virginia	17.63
U.S.A.	*11.30*

Figure 2. Fatality rates per distance driven in the individual states, 2012.

Table 3
Fatality rates per population in the individual states, 2012 (NHTSA, 2014).

| State	Fatality rate per 100 thousand people
District of Columbia	2.37
Massachusetts	5.25
New York	5.97
Rhode Island	6.09
Washington	6.44
Connecticut	6.57
New Jersey	6.64
Minnesota	7.34
Illinois	7.43
California	7.51
Utah	7.60
Alaska	8.07
New Hampshire	8.18
Maryland	8.58
Oregon	8.62
Hawaii	9.05
Colorado	9.10
Nevada	9.35
Virginia	9.49
Michigan	9.49
Ohio	9.73
Pennsylvania	10.26
Wisconsin	10.74
Nebraska	11.43
Idaho	11.53
Iowa	11.87
Indiana	11.92
Georgia	12.02
Vermont	12.30
Maine	12.34
Delaware	12.43
Florida	12.55
Arizona	12.59
Texas	13.04
North Carolina	13.25
Missouri	13.72
Kansas	14.03
Louisiana	15.69
Tennessee	15.71
South Dakota	15.96
Kentucky	17.03
New Mexico	17.50
Alabama	17.94
South Carolina	18.27
West Virginia	18.27
Oklahoma	18.56
Arkansas	18.72
Mississippi	19.50
Montana	20.40
Wyoming	21.34
North Dakota	24.30
U.S.A.	*10.69*
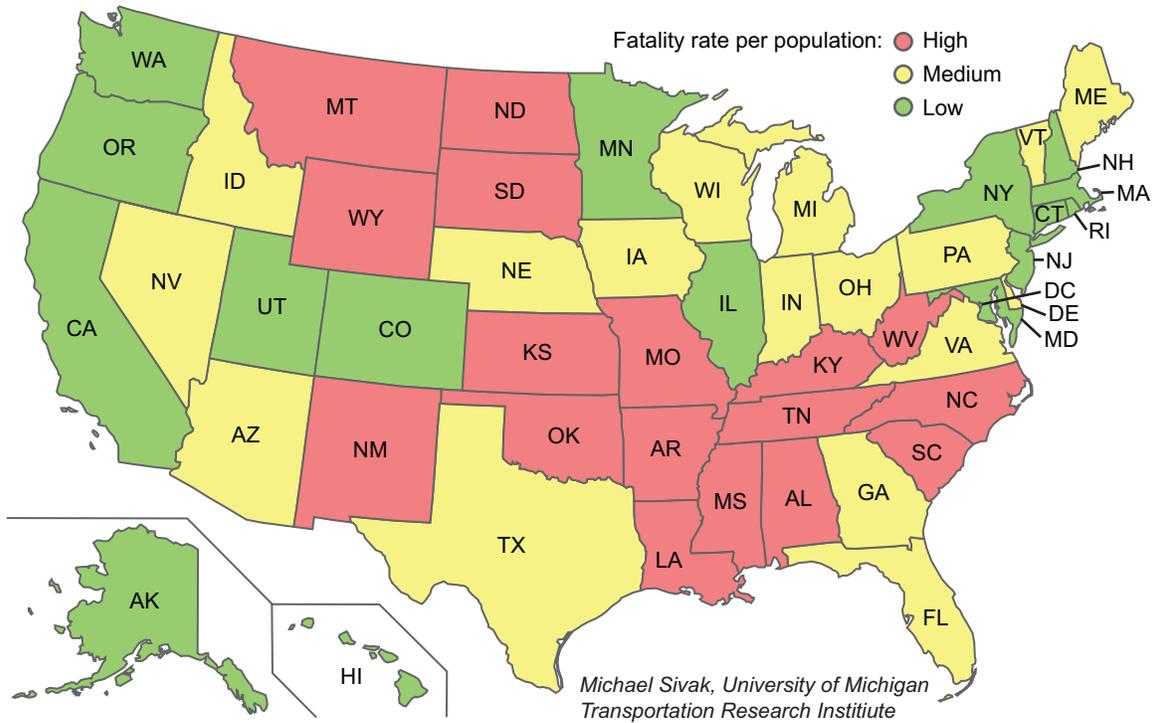
Figure 3. Fatality rates per population in the individual states, 2012.

Recent changes in road safety

Fatalities. Table 4 presents the percentage change from 2005 to 2012 in the numbers of fatalities in each state. In Table 4 and in Figure 4, the states are divided into three groups of 17 each according to the percentage change in the number of fatalities (low, medium, and high). The greatest reductions in fatalities (in decreasing order) were in the District of Columbia, Nevada, Mississippi, New Hampshire, and Missouri. On the other extreme, North Dakota and Vermont showed increases in fatalities; the smallest reductions in fatalities (in increasing order) were in Maine, Texas, and Kansas.

Fatalities per distance driven. Table 5 shows the percentage change from 2005 to 2012 in the fatality rate per distance driven in each state. In Table 5 and in Figure 5, the states are divided into three groups of 17 each according to the percentage change in this rate (low, medium, and high). The greatest reductions in the rate (in decreasing order) were in the District of Columbia, Nevada, Idaho, South Dakota, and Missouri. On the other extreme, Vermont, North Dakota, and Maine showed increases in the rate; the smallest reductions in the rate (in increasing order) were in West Virginia and Texas.

Fatalities per population. Table 6 presents the percentage change from 2005 to 2012 in the fatality rate per population in each state. In Table 6 and in Figure 6, the states are divided into three groups of 17 each according to the percentage change in this rate (low, medium, and high). The greatest reductions in the rate (in decreasing order) were in the District of Columbia, Nevada, Idaho, Mississippi, and Washington. On the other extreme, North Dakota and Vermont showed increases in the rate; the smallest reductions in the rate (in increasing order) were in Maine, Kansas, and West Virginia.

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Table 4
Percentage changes in the number of fatalities in the individual states, 2012 vs. 2005.
(Calculated from information in NHTSA [2014, 2007].)

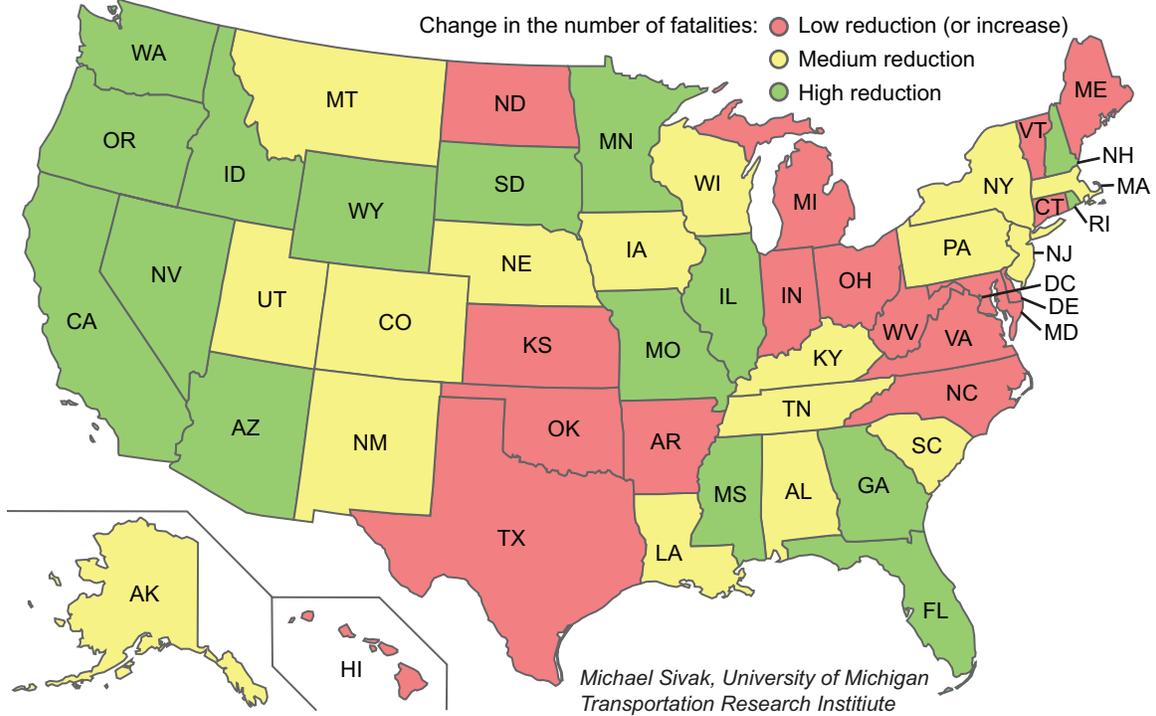| State	Change in the number of fatalities (%)
District of Columbia	-68.8
Nevada	-39.6
Mississippi	-37.5
New Hampshire	-34.9
Missouri	-34.3
California	-34.0
Idaho	-33.1
Florida	-31.6
Washington	-31.4
Oregon	-31.1
Georgia	-31.1
Arizona	-29.9
Illinois	-29.8
Minnesota	-29.3
South Dakota	-28.5
Wyoming	-27.6
Rhode Island	-26.4
New Mexico	-25.2
Wisconsin	-24.5
Louisiana	-24.4
Kentucky	-24.3
Alabama	-23.5
Nebraska	-23.2
Utah	-23.0
Colorado	-22.1
New Jersey	-21.3
South Carolina	-21.0
Massachusetts	-21.0
Tennessee	-20.2
Pennsylvania	-18.9
Iowa	-18.9
Montana	-18.3
New York	-18.3
Alaska	-18.1
Virginia	-18.0
Maryland	-17.8
Indiana	-17.0
Michigan	-16.9
North Carolina	-15.8
Ohio	-15.1
Delaware	-14.9
Arkansas	-14.8
Connecticut	-13.9
Oklahoma	-11.7
Hawaii	-10.0
West Virginia	-9.4
Kansas	-5.4
Texas	-3.0
Maine	-3.0
Vermont	+5.5
North Dakota	+38.2
U.S.A.	*-22.7*

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Figure 4. Percentage changes in the number of fatalities in the individual states, 2012 vs. 2005.

Table 5
Percentage changes in the fatality rates per distance driven in the individual states, 2012 vs. 2005.
(Calculated from information in NHTSA [2014, 2007] and FHWA [2014, 2011].)

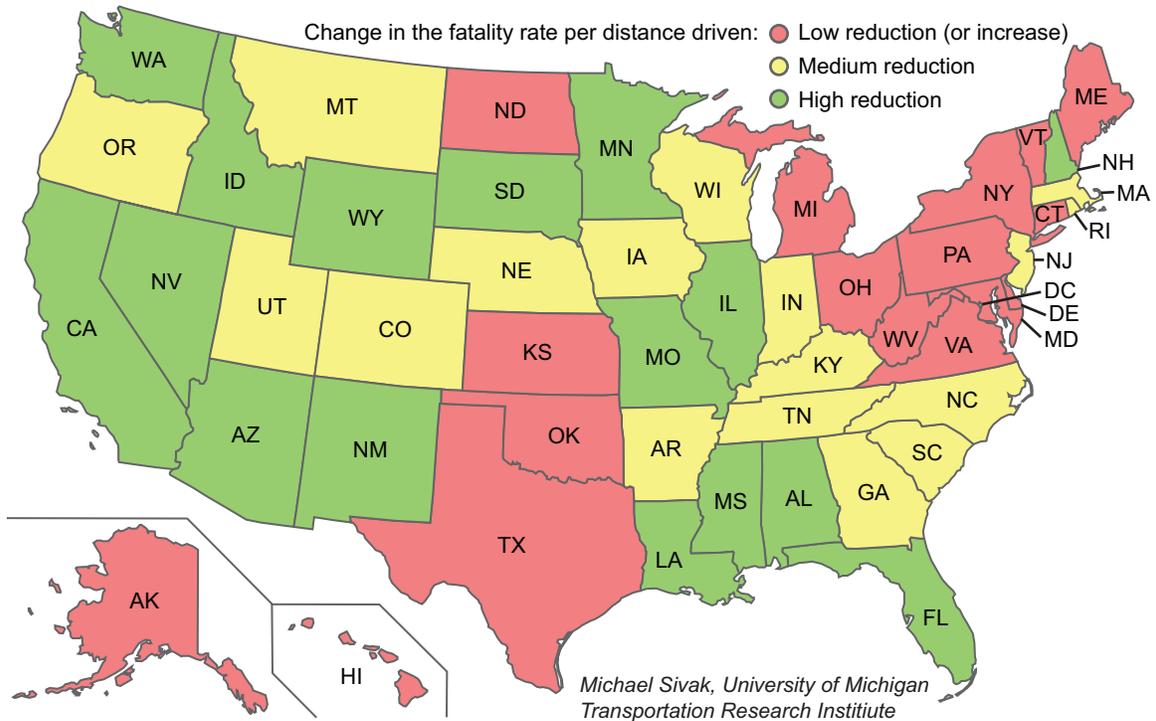| State	Change in the fatality rate per distance driven (%)
District of Columbia	-67.5
Nevada	-48.0
Idaho	-39.0
South Dakota	-34.1
Missouri	-34.0
California	-33.4
Washington	-32.9
New Hampshire	-32.2
Mississippi	-31.8
Arizona	-30.3
New Mexico	-29.9
Alabama	-29.8
Minnesota	-29.4
Wyoming	-29.3
Florida	-28.0
Illinois	-27.7
Louisiana	-27.5
Georgia	-27.2
Utah	-27.0
Oregon	-26.8
Indiana	-24.4
Kentucky	-24.1
Montana	-23.5
Wisconsin	-23.4
Nebraska	-23.1
Rhode Island	-21.8
Massachusetts	-21.7
New Jersey	-21.7
Tennessee	-20.6
South Carolina	-20.4
Iowa	-20.3
Colorado	-20.1
Arkansas	-18.8
North Carolina	-18.7
Virginia	-18.6
Maryland	-18.0
Ohio	-16.8
Alaska	-13.9
Oklahoma	-13.3
Connecticut	-12.8
New York	-12.3
Delaware	-11.9
Pennsylvania	-11.4
Hawaii	-9.7
Michigan	-8.6
Kansas	-8.3
Texas	-4.1
West Virginia	-3.2
Maine	+2.0
North Dakota	+3.8
Vermont	+12.7
U.S.A.	*-22.2*

Figure 5. Percentage changes in the fatality rates per distance driven in the individual states, 2012 vs. 2005.

Table 6

Percentage changes in the fatality rates per population in the individual states, 2012 vs. 2005.
(Calculated from information in NHTSA [2014, 2007].)

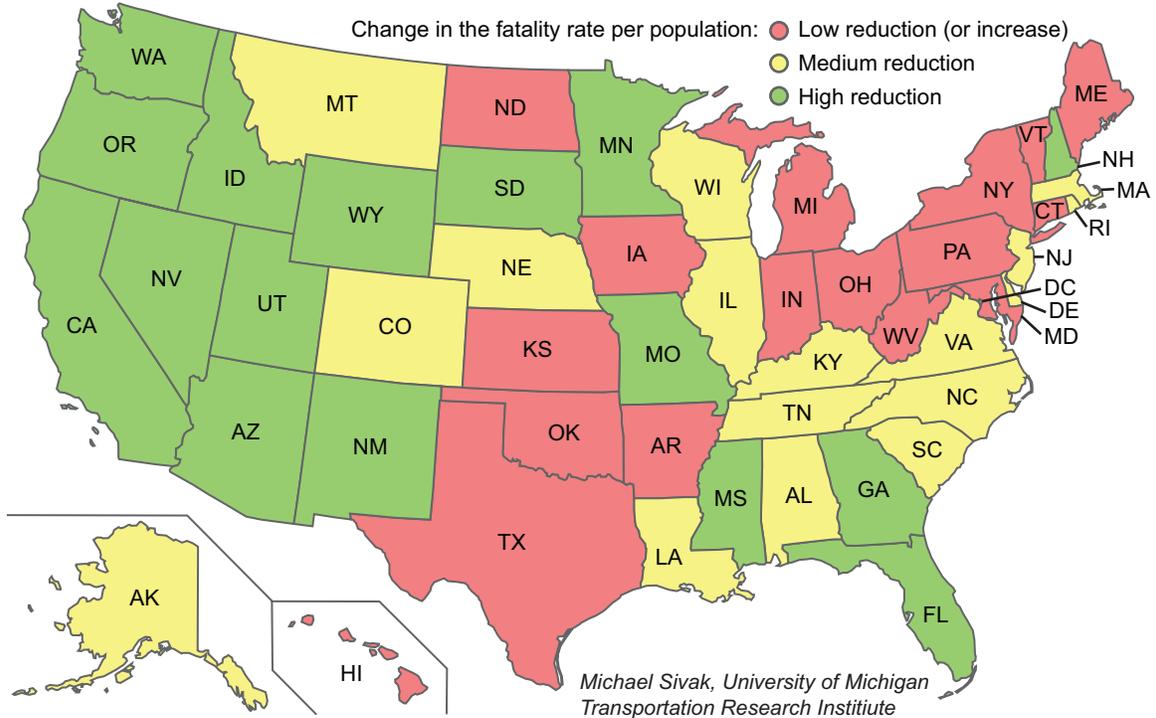| State	Change in the fatality rate per population (%)
District of Columbia	-72.8
Nevada	-47.1
Idaho	-40.1
Mississippi	-38.8
Washington	-37.4
California	-37.3
Florida	-37.0
Georgia	-36.9
Missouri	-36.7
Arizona	-36.5
Wyoming	-36.1
Oregon	-35.7
New Hampshire	-35.4
Utah	-33.5
South Dakota	-33.4
Minnesota	-32.6
New Mexico	-30.9
Illinois	-30.3
Colorado	-29.9
South Carolina	-28.9
Kentucky	-27.8
Alabama	-27.7
Nebraska	-27.2
Wisconsin	-27.0
Tennessee	-26.2
Louisiana	-25.7
Alaska	-25.6
North Carolina	-25.0
Rhode Island	-24.6
Virginia	-24.1
Massachusetts	-24.0
Montana	-24.0
New Jersey	-22.6
Delaware	-21.8
Iowa	-21.8
Maryland	-21.7
Pennsylvania	-21.1
Indiana	-20.3
Arkansas	-19.7
New York	-19.5
Oklahoma	-17.9
Hawaii	-17.6
Connecticut	-15.9
Ohio	-15.7
Michigan	-15.0
Texas	-14.9
West Virginia	-11.3
Kansas	-10.0
Maine	-3.5
Vermont	+4.9
North Dakota	+25.8
U.S.A.	*-27.1*

Figure 6. Percentage changes in the fatality rates per population in the individual states, 2012 vs. 2005.

Discussion

Current status of road safety

The primary measures of road safety used in this report were the fatality rate per distance driven and the fatality rate per population. Because distance driven and population are not perfectly correlated across the states, the ranking of the individual states does vary somewhat based on which of the two measures is being used. The states for which the rankings on these two measures differed most were as follows (with the two entries corresponding to the ranking of the fatality rate per distance driven in 2012 and the ranking of the fatality rate per population in 2012, respectively): Alaska (30, 12), Hawaii (32, 16), Wyoming (36 and 50), and Pennsylvania (35, 22). On the other extreme, the rankings for the following nine states were the same on both measures: the District of Columbia (1), Massachusetts (2), Washington (5), California (10), Idaho (25), Delaware (31), Tennessee (39), Arkansas (47), and Montana (49).

Recent changes in road safety

The assessment of the changes in road safety from 2005 to 2012 also varies somewhat based on which of the two measures is used. The states for which the rankings on these two measures differed most were as follows (with the two entries corresponding to the ranking of changes in the fatality rate per distance driven and the ranking of changes in the fatality rate per population, respectively): Indiana (21, 38), Colorado (32, 19), Alaska (38, 27), and South Dakota (4, 15). On the other extreme, the rankings for the following nine states were the same on both measures: the District of Columbia (1), Nevada (2), Idaho (3), California (6), Arizona (10), Wisconsin (24), Maryland (36), Michigan (45), and Maine (49).

Conclusions

Current status of road safety

Road safety, whether measured by the fatality rate per distance driven or per population, is currently best in the District of Columbia and Massachusetts. On the other extreme, road safety is currently worst in West Virginia and South Carolina (in terms of the fatality rate per distance driven), and in North Dakota and Wyoming (in terms of the fatality rate per population).

Recent changes in road safety

Improvements in road safety from 2005 to 2012, whether measured by percentage changes in the fatality rate per distance driven or per population, were greatest in the District of Columbia and Nevada. On the other hand, road safety in North Dakota and Vermont worsened from 2005 to 2012 using either measure.

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