
**OSU STATISTICAL CONSULTING SERVICE
MEMORANDUM REPORT**

To: The Ohio State Highway Patrol

From: Christopher Holloman

Subject: Predictive Model Results for New Year's Weekend, District 8

Date: December 18, 2006

1. Overview

Over the past several months, the Ohio State Highway Patrol (OSHP) and the Statistical Consulting Service (SCS) at The Ohio State University have worked together to produce a probabilistic model for forecasting the likely locations of fatal and injury crashes. The model that was developed predicts the likelihood of crashes on interstates, US routes, and State routes throughout Ohio.

This report presents the model's OVI forecasts for the 2006-2007 New Year's weekend (Friday, December 29 through Monday, January 1). These results can be used to allocate troopers to different roadways throughout the day allowing OSHP to make the best use of available resources in preventing alcohol-related crashes. Crash forecasts are provided for all interstates, US routes, and state routes in District 8 except for the US and State routes in Hamilton and Fayette counties.

Although the New Year's weekend covers four days, there are only three types of days that need to be analyzed. The first type of day is the last workday before the long weekend: Friday, December 29. The second type of day to be analyzed is the weekend preceding the holiday: Saturday, December 30, and Sunday, December 31. The third type of day to be analyzed is the actual holiday, Monday, January 1, 2007. Section 2 of this report gives OVI forecasts for each of these types of days separately.

The forecasts provided in this report can be applied to the immediately preceding weekend as well – the weekend of Christmas, 2006. The forecasts for Friday, December 29 through Sunday, December 31 are identical to what would be predicted for Friday, December 22 through Sunday, December 24, and the forecasts for December 25, 2006 would only vary slightly from what is presented for January 1, 2007.

2. Forecasts

The forecasts are broken down by the three types of days that occur over the New Year's weekend.

2.1. Friday, December 29, 2006

Friday, December 29 is the last working day before the long weekend, so the crash patterns are predicted to be different from the crash patterns on the other days of the holiday. Figure 1 shows the OVI crash rates for fatal and injury crashes expected throughout the day. These are the crash rates across all interstates, US routes, and state routes in the analysis. The black line in this figure shows the crash rates predicted by the model, and a smooth red curve has been superimposed to show the overall pattern. In addition, a smooth green line has been added to the plot showing the crash rates expected on an ordinary Friday in December, one not preceding a holiday weekend. It appears that on December 29 the highest risk will be in the early morning hours, but it will not be as large as on a usual Friday. The risk declines in the middle of the day, and increases again at the end of the day, although the increase is not larger than what is normally observed on a Friday evening.

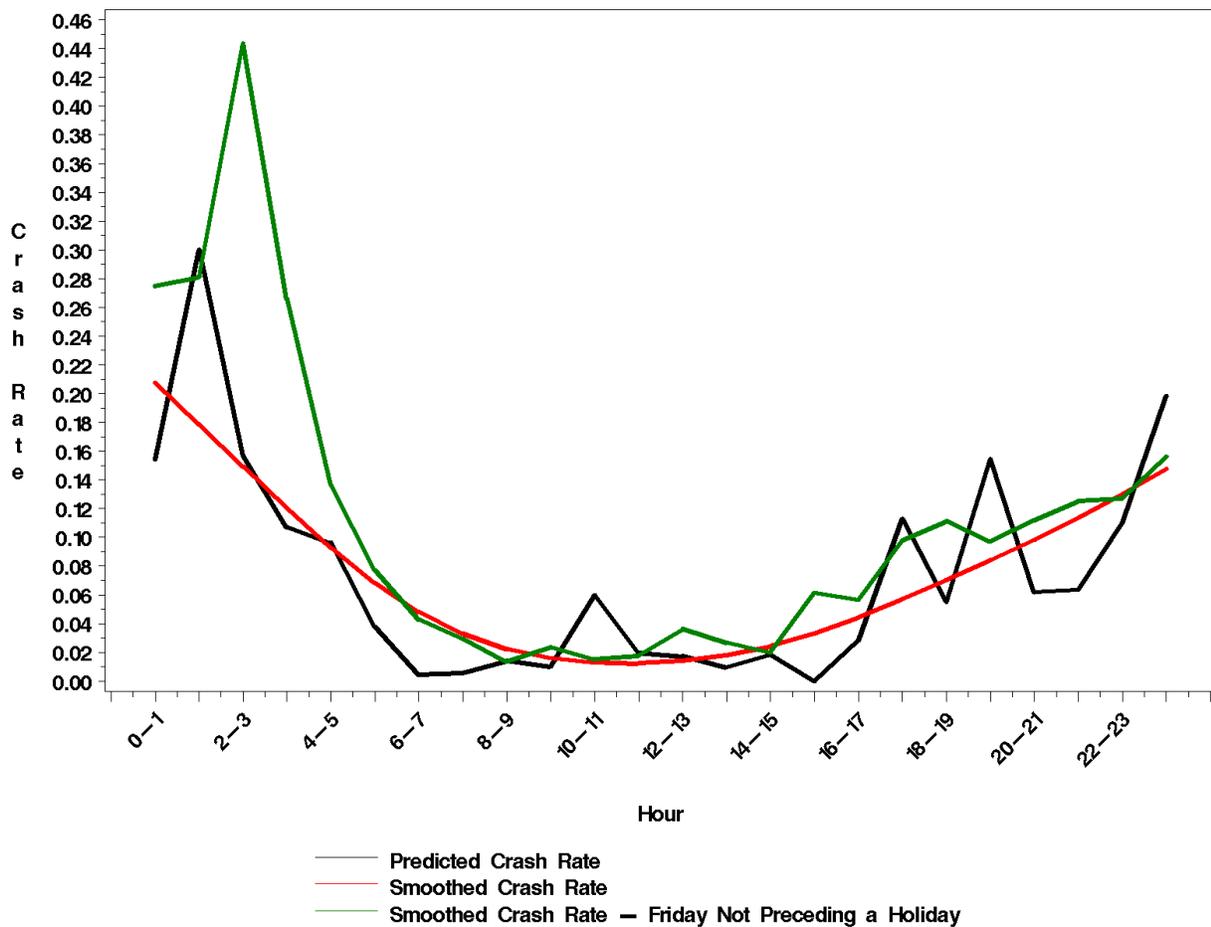


Figure 1. Forecasted OVI Fatal and Injury Crash Rates on December 29, 2006, by Hour.

Having determined the best allocation of resources throughout the day, the next question to answer is where those resources should be allocated. The top 20% of roadways that should be patrolled to prevent alcohol-related crashes on December 29, 2006, are in the following list.

1. IR 75 from milepost 0 in HAM to milepost 17 in HAM.
2. IR 71 from milepost 0 in HAM to milepost 1 in HAM.
3. IR 71 from milepost 2 in HAM to milepost 4 in HAM.
4. IR 74 from milepost 18 in HAM to milepost 19 in HAM.
5. IR 75 from milepost 19 in BUT to milepost 23 in BUT.
6. IR 275 from milepost 39 in HAM to milepost 45 in HAM.
7. IR 75 from milepost 38 in WAR to milepost 40 in WAR.
8. IR 71 from milepost 5 in HAM to milepost 10 in HAM.
9. IR 275 from milepost 64 in CLE to milepost 67 in CLE.
10. IR 71 from milepost 11 in HAM to milepost 13 in HAM.
11. IR 75 from milepost 35 in WAR to milepost 36 in WAR.
12. IR 675 from milepost 7 in GRE to milepost 10 in GRE.
13. IR 75 from milepost 27 in BUT to milepost 28 in BUT.
14. IR 75 from milepost 32 in WAR to milepost 34 in WAR.
15. IR 74 from milepost 7 in HAM to milepost 8 in HAM.
16. IR 71 from milepost 14 in HAM to milepost 18 in HAM.
17. IR 275 from milepost 47 in HAM to milepost 50 in HAM.
18. IR 75 from milepost 29 in WAR to milepost 31 in WAR.
19. IR 71 from milepost 20 in WAR to milepost 23 in WAR.
20. IR 675 from milepost 12 in GRE to milepost 14 in GRE.
21. IR 471 from milepost 0 in HAM to milepost 1 in HAM.
22. SR 749 from milepost 5 in CLE to milepost 6 in CLE.
23. IR 675 from milepost 22 in GRE to milepost 24 in GRE.
24. IR 74 from milepost 9 in HAM to milepost 10 in HAM.
25. IR 74 from milepost 12 in HAM to milepost 13 in HAM.
26. IR 275 from milepost 59 in CLE to milepost 61 in CLE.
27. IR 75 from milepost 17 in BUT to milepost 18 in BUT.
28. IR 275 from milepost 54 in CLE to milepost 55 in CLE.
29. IR 75 near milepost 41 in WAR.
30. IR 71 from milepost 25 in WAR to milepost 26 in WAR.
31. IR 75 from milepost 25 in BUT to milepost 26 in BUT.
32. SR 122 from milepost 10 in BUT to milepost 11 in BUT.
33. IR 74 from milepost 16 in HAM to milepost 17 in HAM.
34. IR 74 from milepost 5 in HAM to milepost 6 in HAM.
35. IR 275 from milepost 57 in CLE to milepost 58 in CLE.
36. IR 275 from milepost 36 in HAM to milepost 37 in HAM.
37. IR 275 from milepost 52 in HAM to milepost 53 in HAM.

2.2. Saturday, December 30, and Sunday, December 31, 2006

Saturday, December 30, and Sunday, December 31, are both considered ordinary weekend days in the crash model, so their predicted crash patterns are the same. Figure 2 shows the OVI crash

rates for fatal and injury crashes expected throughout the day. These are the OVI crash rates across all interstates, US routes, and state routes in the analysis. The figure contains only one curve, a red curve, since the smoothed crash pattern lies directly on top of the raw (black) crash pattern.

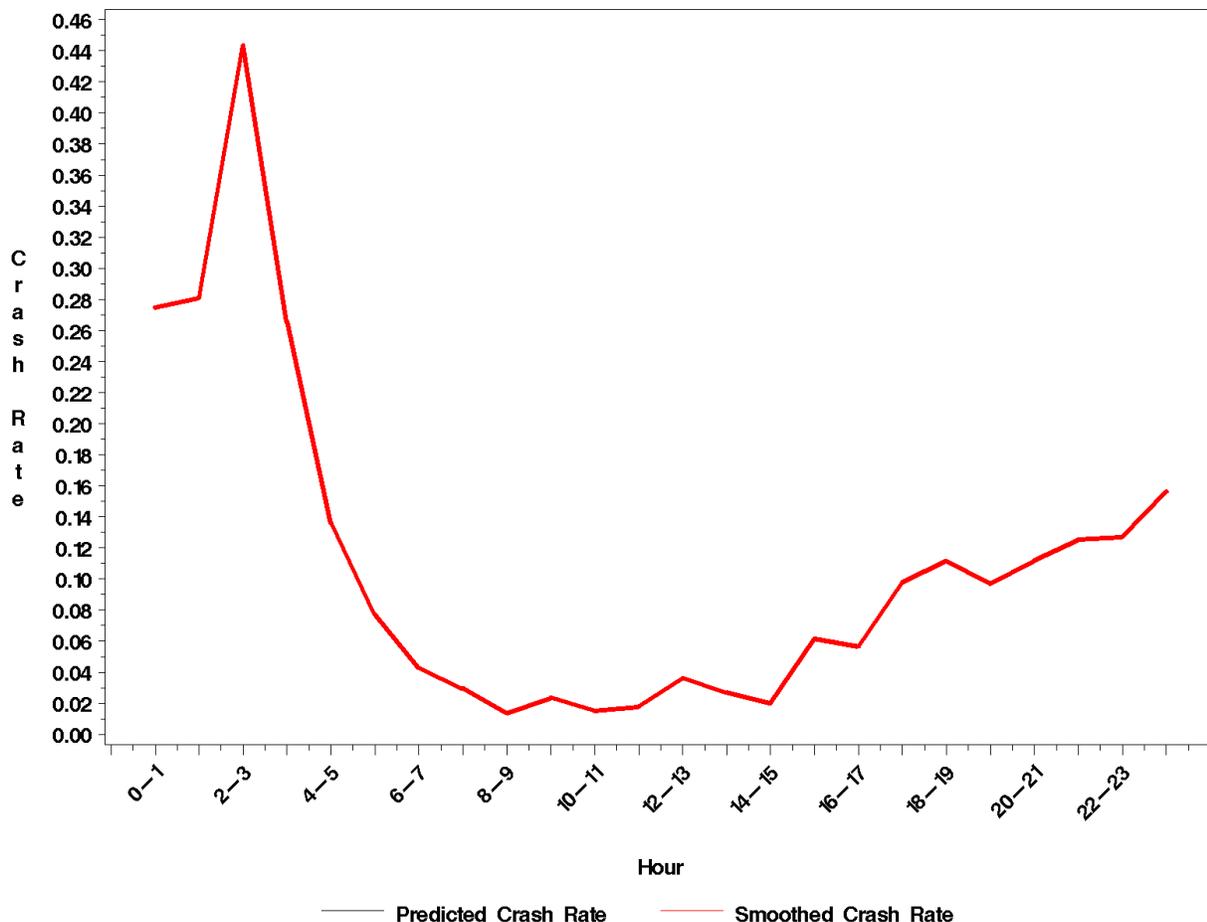


Figure 2. Forecasted OVI Fatal and Injury Crash Rates on December 30-31, 2006, by Hour.

Having determined the best allocation of resources throughout the day, the next question to answer is where those resources should be allocated. The top 20% of roadways that should be patrolled to prevent alcohol-related crashes on December 30-31, 2006, are in the following list.

1. IR 75 from milepost 0 in HAM to milepost 17 in HAM.
2. IR 71 from milepost 0 in HAM to milepost 1 in HAM.
3. IR 71 from milepost 2 in HAM to milepost 4 in HAM.
4. IR 74 from milepost 18 in HAM to milepost 19 in HAM.
5. SR 749 from milepost 5 in CLE to milepost 6 in CLE.
6. IR 75 from milepost 37 in WAR to milepost 40 in WAR.
7. IR 74 from milepost 7 in HAM to milepost 8 in HAM.
8. IR 71 from milepost 5 in HAM to milepost 10 in HAM.
9. IR 75 from milepost 19 in BUT to milepost 22 in BUT.

10. IR 275 from milepost 41 in HAM to milepost 45 in HAM.
11. IR 675 from milepost 7 in GRE to milepost 10 in GRE.
12. IR 275 from milepost 39 in HAM to milepost 40 in HAM.
13. IR 275 from milepost 65 in CLE to milepost 66 in CLE.
14. IR 75 from milepost 35 in WAR to milepost 36 in WAR.
15. IR 75 from milepost 32 in WAR to milepost 34 in WAR.
16. IR 275 from milepost 60 in CLE to milepost 61 in CLE.
17. IR 71 from milepost 11 in HAM to milepost 12 in HAM.
18. IR 75 from milepost 17 in BUT to milepost 18 in BUT.
19. IR 71 from milepost 17 in HAM to milepost 18 in HAM.
20. IR 75 from milepost 27 in BUT to milepost 28 in BUT.
21. IR 275 from milepost 47 in HAM to milepost 50 in HAM.
22. SR 122 from milepost 10 in BUT to milepost 11 in BUT.
23. IR 75 from milepost 29 in WAR to milepost 31 in WAR.
24. IR 675 from milepost 12 in GRE to milepost 14 in GRE.
25. SR 4 from milepost 0 in BUT to milepost 5 in BUT.
26. IR 471 from milepost 0 in HAM to milepost 1 in HAM.
27. IR 71 from milepost 14 in HAM to milepost 16 in HAM.
28. IR 71 from milepost 20 in WAR to milepost 21 in WAR.
29. IR 675 from milepost 22 in GRE to milepost 24 in GRE.
30. IR 74 from milepost 9 in HAM to milepost 10 in HAM.
31. IR 74 from milepost 12 in HAM to milepost 14 in HAM.
32. SR 444 from milepost 0 in GRE to milepost 5 in GRE.
33. IR 275 from milepost 53 in CLE to milepost 54 in CLE.
34. SR 128 from milepost 5 in BUT to milepost 10 in BUT.

2.3. Monday, January 1, 2007

Monday, January 1 is treated as a holiday in the crash model. Figure 3 shows the OVI crash rates for fatal and injury crashes expected throughout the day. These are the crash rates across all interstates, US routes, and state routes in the analysis. The black line in this figure shows the crash rates predicted by the model, and a smooth red curve has been superimposed to show the overall pattern. In addition, a smooth green line has been added to the plot showing the crash rates expected on an ordinary Monday in January. This figure shows that crash risk from alcohol will be higher during most of the day than it is on an ordinary Monday with the highest risk during the early morning hours and mid-afternoon.

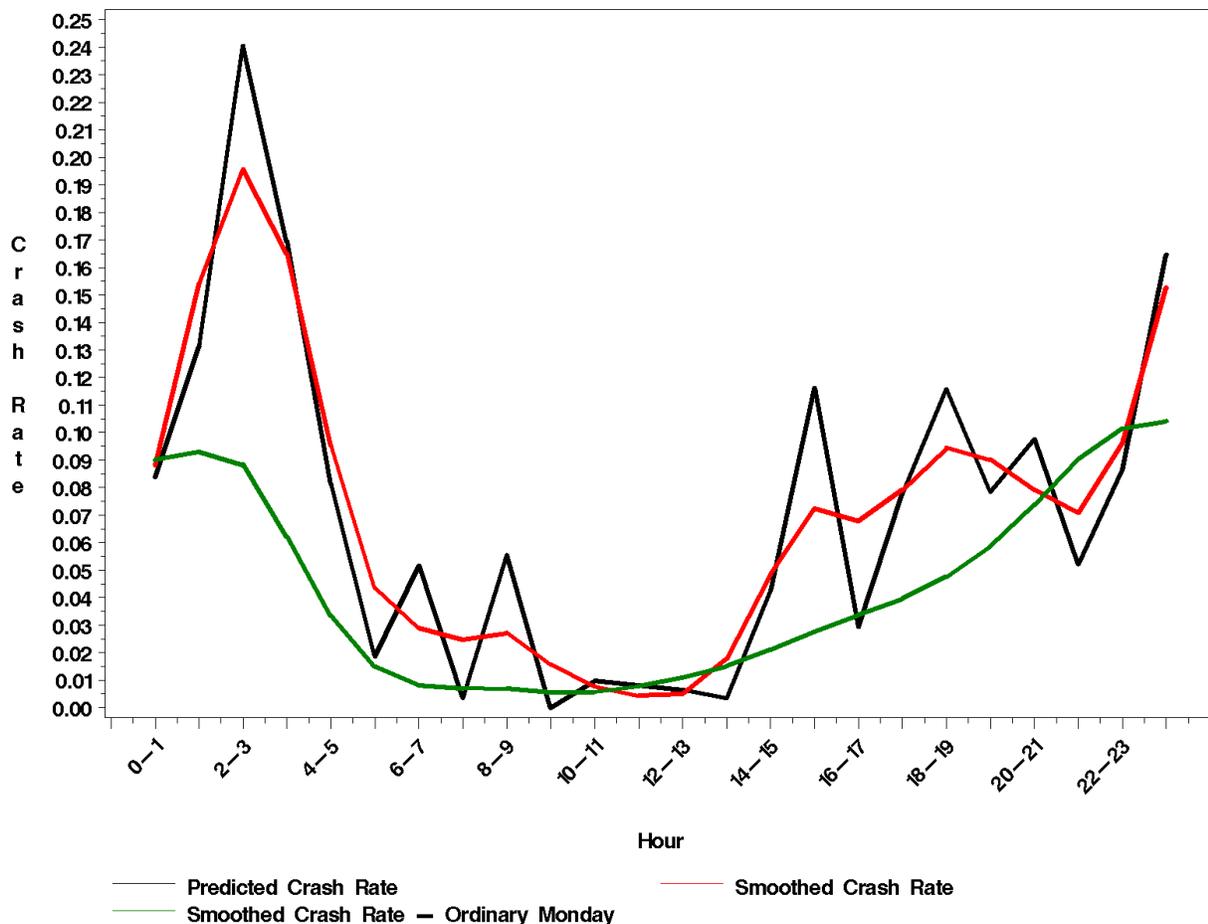


Figure 3. Forecasted OVI Fatal and Injury Crash Rates on January 1, 2007, by Hour.

Having determined the best allocation of resources throughout the day, the next question to answer is where those resources should be allocated. The top 20% of roadways that should be patrolled to prevent alcohol-related crashes on January 1, 2007, are in the following list.

1. IR 75 from milepost 0 in HAM to milepost 17 in HAM.
2. IR 71 from milepost 0 in HAM to milepost 1 in HAM.
3. IR 71 from milepost 2 in HAM to milepost 4 in HAM.
4. IR 74 from milepost 18 in HAM to milepost 19 in HAM.
5. SR 749 from milepost 0 in CLE to milepost 6 in CLE.
6. IR 75 from milepost 20 in BUT to milepost 22 in BUT.
7. IR 275 from milepost 39 in HAM to milepost 40 in HAM.
8. IR 275 from milepost 41 in HAM to milepost 45 in HAM.
9. IR 71 from milepost 5 in HAM to milepost 7 in HAM.
10. IR 75 from milepost 38 in WAR to milepost 40 in WAR.
11. IR 71 from milepost 11 in HAM to milepost 12 in HAM.
12. IR 75 from milepost 32 in WAR to milepost 34 in WAR.
13. IR 675 from milepost 7 in GRE to milepost 10 in GRE.
14. IR 275 from milepost 65 in CLE to milepost 66 in CLE.

15. IR 74 from milepost 7 in HAM to milepost 8 in HAM.
16. IR 75 from milepost 27 in BUT to milepost 28 in BUT.
17. SR 122 from milepost 10 in BUT to milepost 11 in BUT.
18. IR 75 from milepost 35 in WAR to milepost 36 in WAR.
19. IR 71 from milepost 14 in HAM to milepost 16 in HAM.
20. IR 71 from milepost 8 in HAM to milepost 10 in HAM.
21. IR 275 from milepost 47 in HAM to milepost 50 in HAM.
22. IR 71 from milepost 17 in HAM to milepost 18 in HAM.
23. SR 4 from milepost 0 in BUT to milepost 5 in BUT.
24. IR 471 from milepost 0 in HAM to milepost 1 in HAM.
25. IR 71 from milepost 22 in WAR to milepost 23 in WAR.
26. IR 675 from milepost 12 in GRE to milepost 14 in GRE.
27. IR 71 from milepost 20 in WAR to milepost 21 in WAR.
28. IR 275 from milepost 60 in CLE to milepost 61 in CLE.
29. IR 675 from milepost 22 in GRE to milepost 24 in GRE.
30. IR 75 from milepost 29 in WAR to milepost 31 in WAR.
31. SR 444 from milepost 0 in GRE to milepost 5 in GRE.
32. IR 75 from milepost 17 in BUT to milepost 18 in BUT.
33. IR 74 from milepost 9 in HAM to milepost 10 in HAM.
34. IR 74 from milepost 12 in HAM to milepost 13 in HAM.