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**OSU STATISTICAL CONSULTING SERVICE  
MEMORANDUM REPORT**

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**To: The Ohio State Highway Patrol**

**From: Christopher Holloman**

**Subject: Predictive Model Results for New Year's Weekend, Cuyahoga County**

**Date: December 18, 2006**

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## **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 Cuyahoga County.

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.

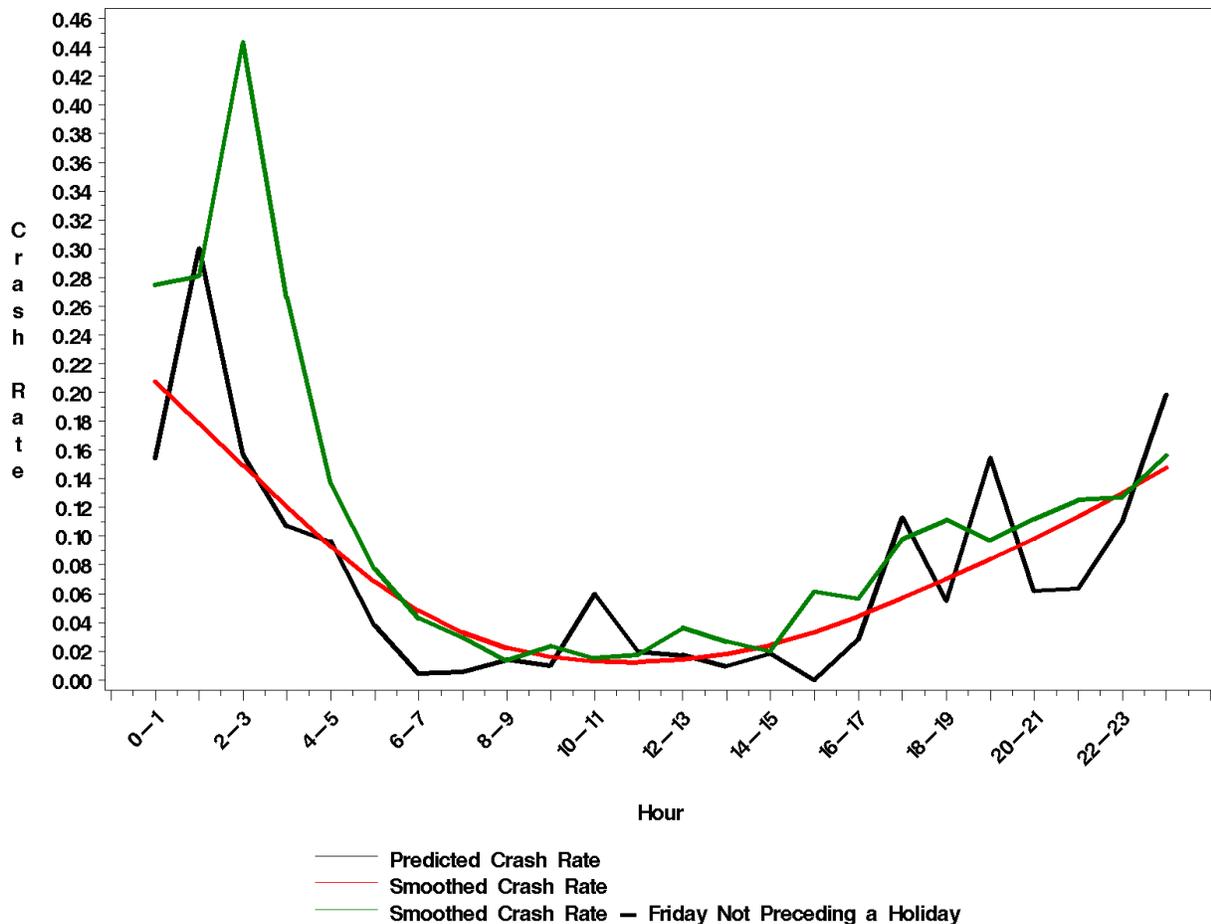


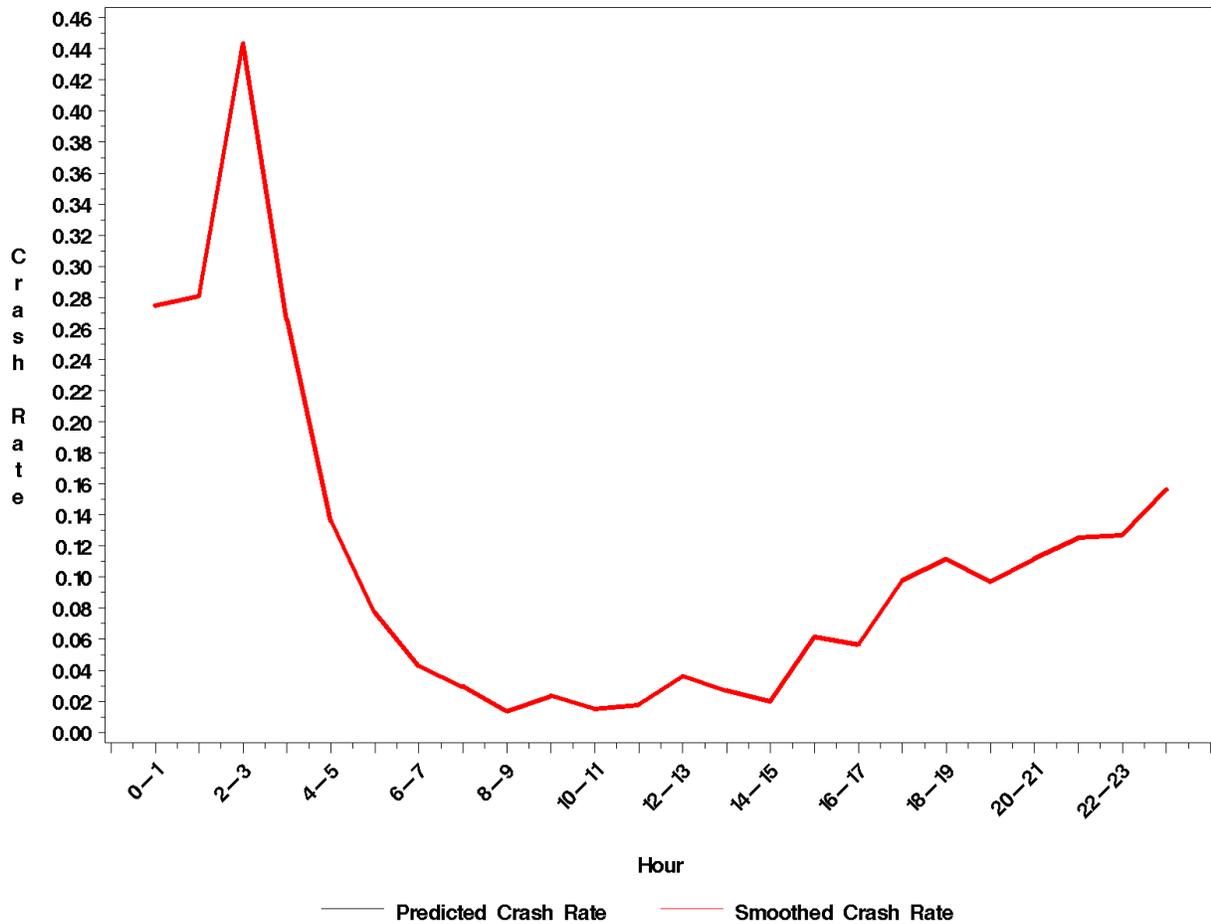
Figure 1. Forecasted OVI Fatal and Injury Crash Rates on December 29, 2006, by Hour.

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 77 from milepost 156 in CUY to milepost 157 in CUY.
2. IR 480 from milepost 20 in CUY to milepost 24 in CUY.
3. IR 77 from milepost 159 in CUY to milepost 160 in CUY.
4. IR 90 from milepost 172 in CUY to milepost 174 in CUY.
5. IR 480 from milepost 15 in CUY to milepost 16 in CUY.
6. IR 90 from milepost 177 in CUY to milepost 179 in CUY.
7. IR 90 from milepost 182 in CUY to milepost 184 in CUY.
8. IR 71 from milepost 246 in CUY to milepost 248 in CUY.
9. IR 271 from milepost 35 in CUY to milepost 37 in CUY.
10. IR 480 from milepost 17 in CUY to milepost 20 in CUY.
11. IR 71 from milepost 235 in CUY to milepost 236 in CUY.
12. IR 271 from milepost 32 in CUY to milepost 34 in CUY.
13. IR 77 from milepost 152 in CUY to milepost 153 in CUY.
14. IR 90 from milepost 185 in CUY to milepost 186 in CUY.
15. IR 77 from milepost 162 in CUY to milepost 163 in CUY.
16. IR 90 from milepost 161 in CUY to milepost 162 in CUY.
17. IR 271 from milepost 30 in CUY to milepost 31 in CUY.

## 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 77 from milepost 156 in CUY to milepost 157 in CUY.
2. IR 480 from milepost 20 in CUY to milepost 24 in CUY.
3. IR 90 from milepost 177 in CUY to milepost 179 in CUY.
4. IR 271 from milepost 35 in CUY to milepost 37 in CUY.
5. IR 90 from milepost 172 in CUY to milepost 174 in CUY.
6. IR 90 from milepost 182 in CUY to milepost 184 in CUY.
7. IR 77 from milepost 159 in CUY to milepost 160 in CUY.
8. IR 480 from milepost 19 in CUY to milepost 21 in CUY.
9. IR 480 from milepost 17 in CUY to milepost 18 in CUY.
10. IR 480 from milepost 15 in CUY to milepost 16 in CUY.
11. IR 71 from milepost 234 in CUY to milepost 236 in CUY.
12. IR 90 from milepost 185 in CUY to milepost 186 in CUY.
13. IR 71 from milepost 245 in CUY to milepost 247 in CUY.
14. IR 271 from milepost 30 in CUY to milepost 31 in CUY.

15. IR 77 from milepost 152 in CUY to milepost 153 in CUY.
16. IR 90 from milepost 161 in CUY to milepost 162 in CUY.
17. IR 271 from milepost 32 in CUY to milepost 34 in CUY.

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.

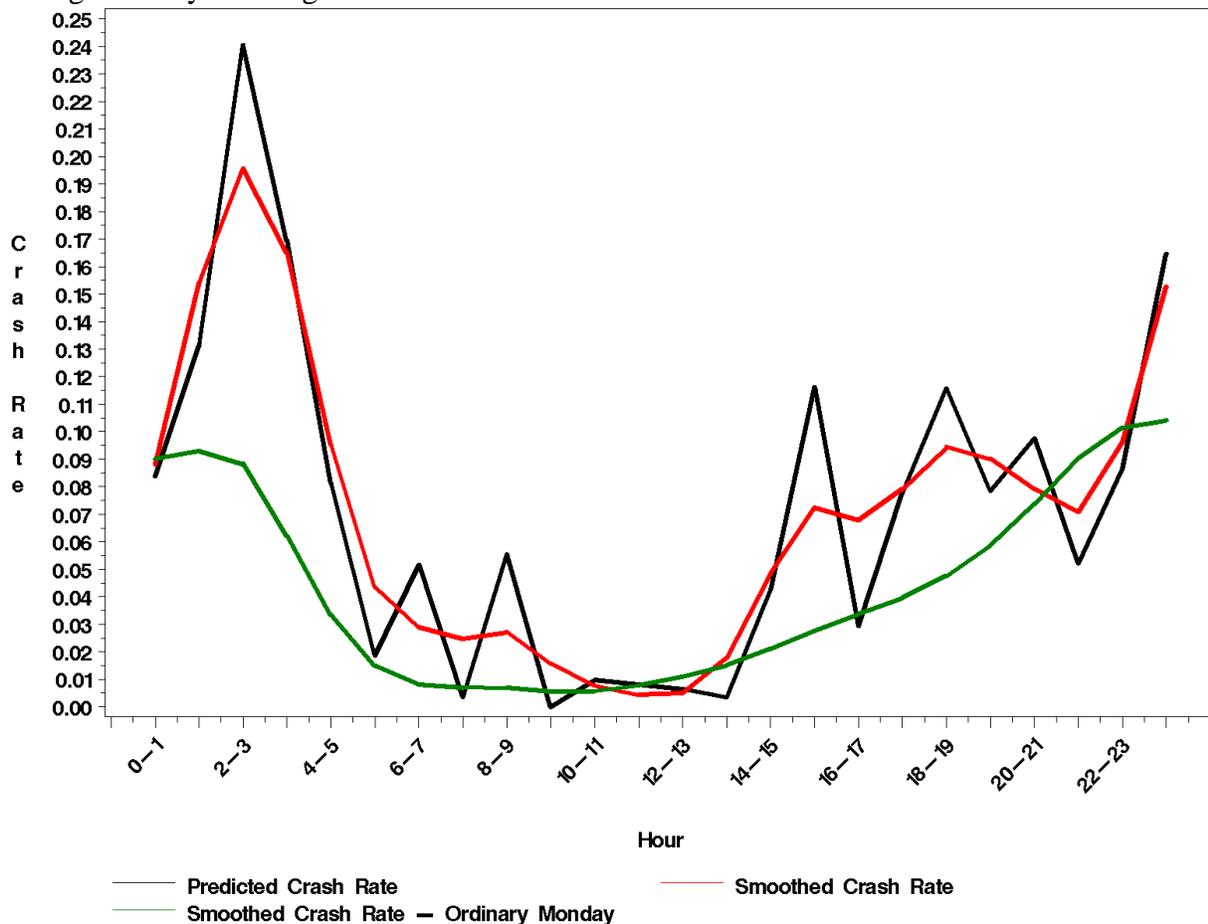


Figure 3. Forecasted OVI Fatal and Injury Crash Rates on January 1, 2007, by Hour.

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 77 from milepost 156 in CUY to milepost 157 in CUY.

2. IR 480 from milepost 20 in CUY to milepost 24 in CUY.
3. IR 90 from milepost 177 in CUY to milepost 179 in CUY.
4. IR 77 from milepost 159 in CUY to milepost 160 in CUY.
5. IR 271 from milepost 35 in CUY to milepost 37 in CUY.
6. IR 90 from milepost 182 in CUY to milepost 184 in CUY.
7. IR 90 from milepost 172 in CUY to milepost 174 in CUY.
8. IR 480 from milepost 15 in CUY to milepost 16 in CUY.
9. IR 480 from milepost 19 in CUY to milepost 20 in CUY.
10. IR 480 from milepost 17 in CUY to milepost 18 in CUY.
11. IR 71 from milepost 245 in CUY to milepost 248 in CUY.
12. IR 71 from milepost 235 in CUY to milepost 236 in CUY.
13. IR 271 from milepost 32 in CUY to milepost 34 in CUY.
14. IR 77 from milepost 152 in CUY to milepost 153 in CUY.
15. IR 90 from milepost 161 in CUY to milepost 162 in CUY.
16. IR 271 from milepost 30 in CUY to milepost 31 in CUY.
17. IR 71 from milepost 242 in CUY to milepost 243 in CUY.
18. IR 90 from milepost 185 in CUY to milepost 186 in CUY.