

**White Paper – I-95 Corridor Coalition
Vehicle Probe Project
Improvement of Real-Time Data in the I-95 Corridor Coalition’s Vehicle Probe Project
May 2010**

The I-95 Corridor Coalition’s Vehicle Probe Project (VPP) has been providing real-time traffic data to many Coalition states since July 2008. Monthly validation conducted by the University of Maryland (UMD) has indicated that the data provided by INRIX Corporation is within the contractual specification for accuracy. Each estimate of speed and volume is accompanied by a score of “10”, “20”, or “30”. The three discrete values correspond to^{1, 2}

“30” – data is exclusively generated from current real-time sources

“20” – data is generated from a mix of real-time and historical data

“10” – data is exclusively generated using historical data

The purpose of this analysis is to determine the percentage of real-time data as indicated by a score of “30” reported in the I-95 Corridor Coalition’s VPP data and to determine if the percentage has changed over the course of the project, and its relationship to time of day.

To perform the analysis, the archive maintained at the University of Maryland (UMD) Center for Advanced Transportation Technology Laboratory (CATT Lab) was used as the source of historical vehicle probe data. The CATT Lab maintains the archive by recording the I-95 Corridor Coalition’s VPP data feed every minute, and has been doing so since October 2008. Data was queried in one hour increments from October 2008 to March 2010 for the freeways in the core coverage area in the state of Maryland. Note that the same analysis described in the body of this memo for the state of Maryland is repeated for the states of Virginia, Pennsylvania, New Jersey, North Carolina, and Delaware and the results are included as an attachment.

Figure 1 shows the average percentage of time that a Score of “30” was observed during 24 hours based on data from October 2008 to March 2010. The graph in Figure 1 follows expected volume trends for most freeways in which low volume periods from roughly 10PM until 5AM in the morning correspond to periods during which the percentage of Score “30” is lowest, and the hours of 5AM to 10PM corresponding to high volume periods are most likely to have a Score of “30” in the Vehicle Probe project.

¹ I-95 Vehicle Probe: I-95 Interface Guide, updated January 2010, version 3.2

² White Paper, I-95 Corridor Coalition Vehicle Probe Project: Confidence Value and Smoothing, April 2010

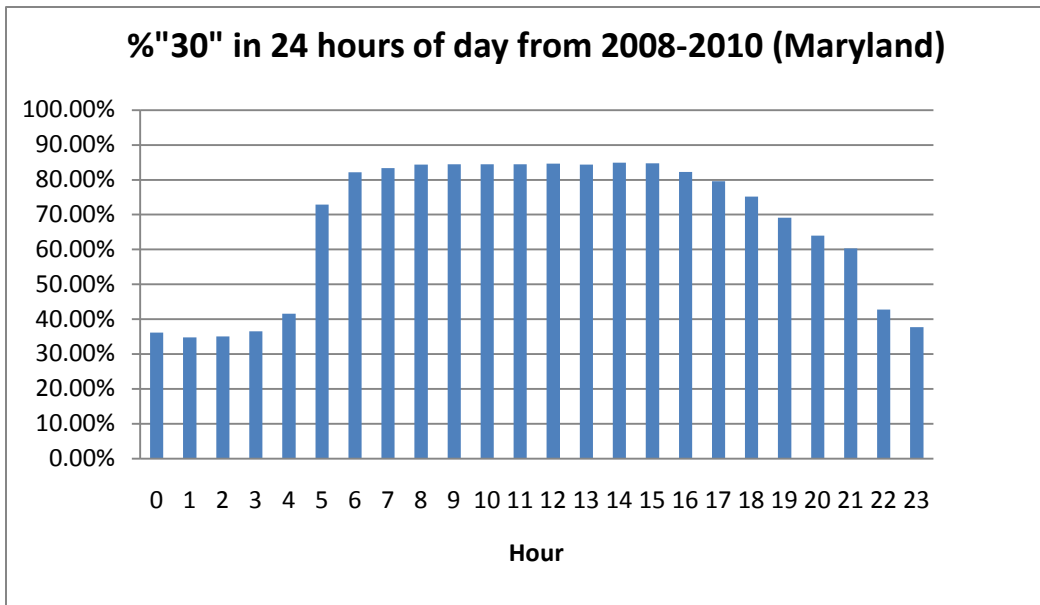


Figure1. Percentage of score "30" from October 2008 to March 2010 during 24 hours in Maryland

Figure 2 displays the distribution of scores "10", "20" and "30" on a monthly basis from Oct 2008 to March 2010. On average, the portion of "30" Scores began slightly above 50% in the final months of 2008 and has increased to nearly 70% in March 2010. Seasonal impacts due to traffic volume are also evident in the data. If the trend continues, the peak travel months during the summer of 2010 should average well above 70%.

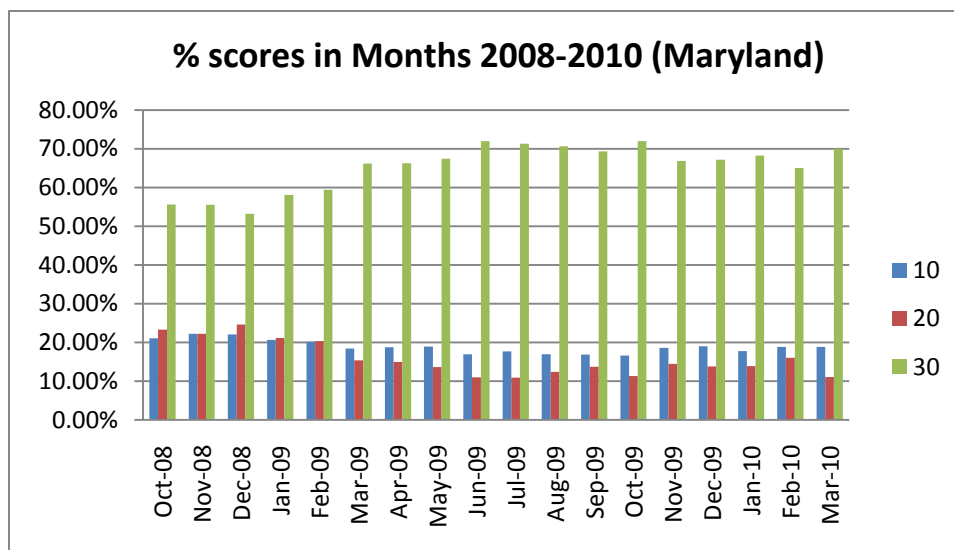


Figure 2. Percentage of all score from October 2008 to March 2010 in Maryland

To investigate trending, the percentage of score “30” during daytime hours vs. nighttime hours was analyzed and graphed between October 2008 and March 2010 in the following figures. The data set is divided into two periods. The first is from 6:00 AM to 5:59 PM, corresponding to the daytime travel period when volumes are expected to be greatest, and the other is 6:00 PM to 5:59 AM, corresponding to the evening and nighttime travel periods of generally lesser volume. The results are shown in Figures 3 and 4 respectively.

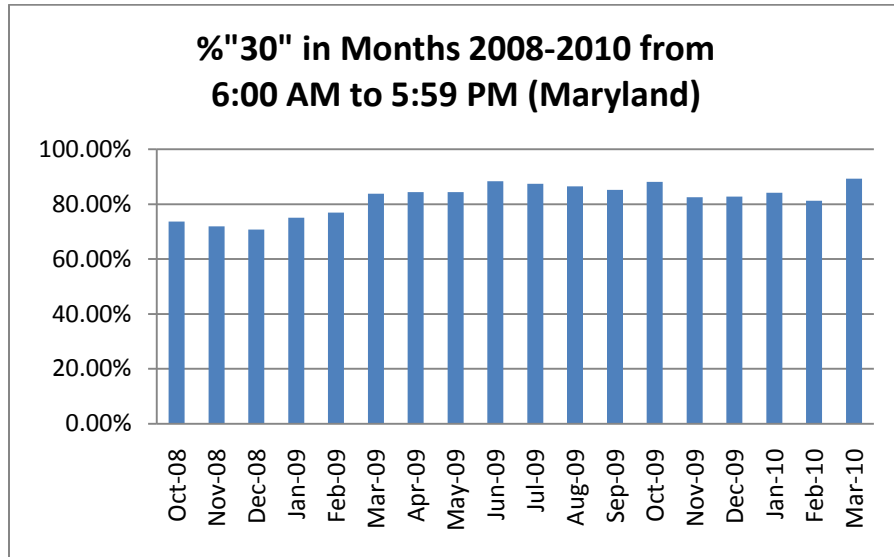


Figure 3. Percentage of score “30” from 6:00 AM to 5:59 PM, from October 2008 to March 2010 in Maryland

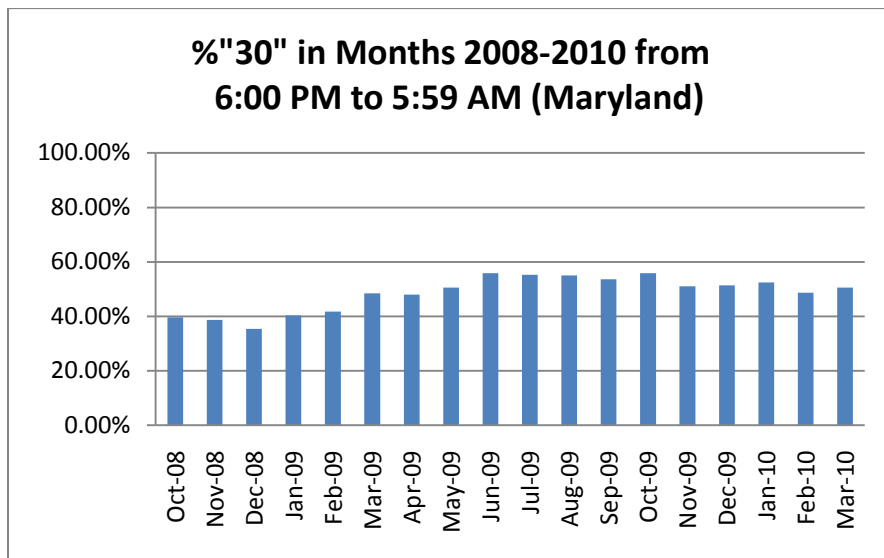


Figure 4. Percentage of score “30” from 6:00 PM to 5:59 AM, from October 2008 to March 2010 in Maryland

Both graphs indicate that the data quality has improved since 2008, each improving roughly 10 percentage points. Also note that seasonal travel volumes are apparent, June through September (the months with greatest traffic volume) are also the months with the greatest percent of high confidence scores of 30. The daytime confidence has improved from roughly 70% at the start of project, to over 80% at present. Similarly, during evening and nighttime hours the percent of high confidence scores started at below 40%, and is presently consistently above 50%. This indicates that INRIX has been successful in improving its core data quality.

Figure 5 is a surface plot showing the percentage of real-time (score of 30) for each hour during this time period. Moreover, the increase of “30” is obvious during the evening and times that less data is available.

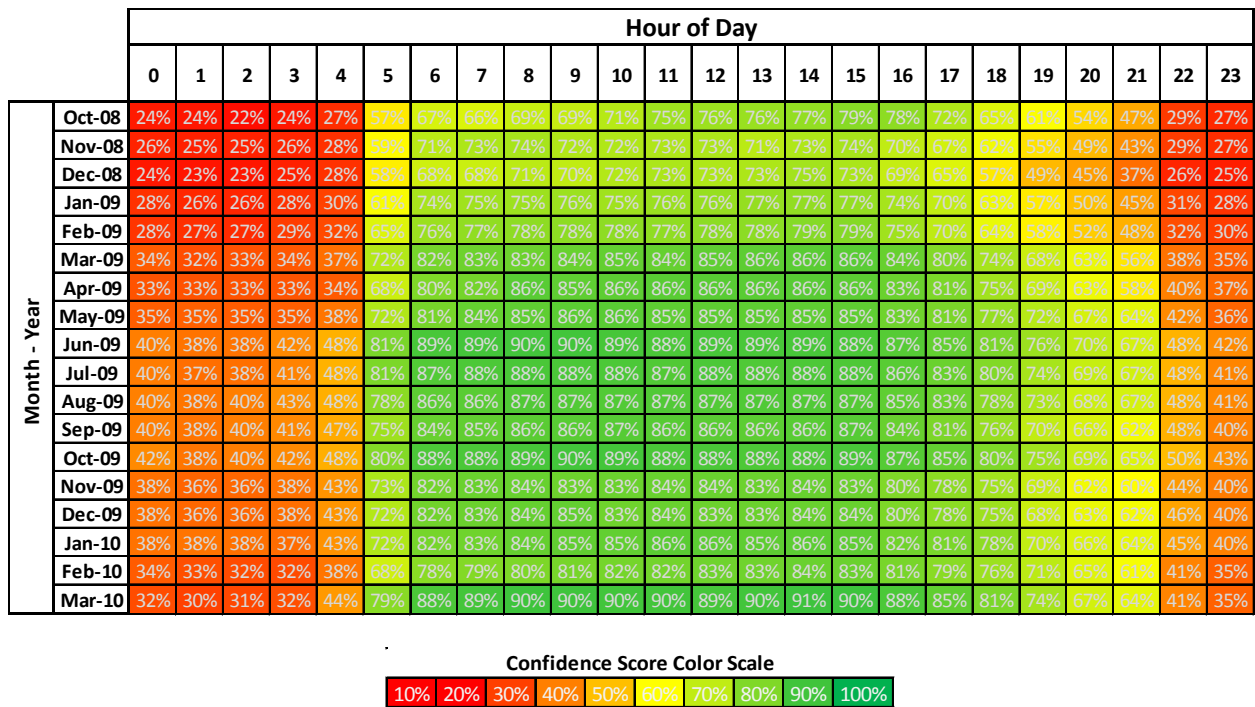


Figure 5. Percentage of score “30” from October 2008 to March 2010 during 24 hours in Maryland

Attachment:

(A) State of Virginia

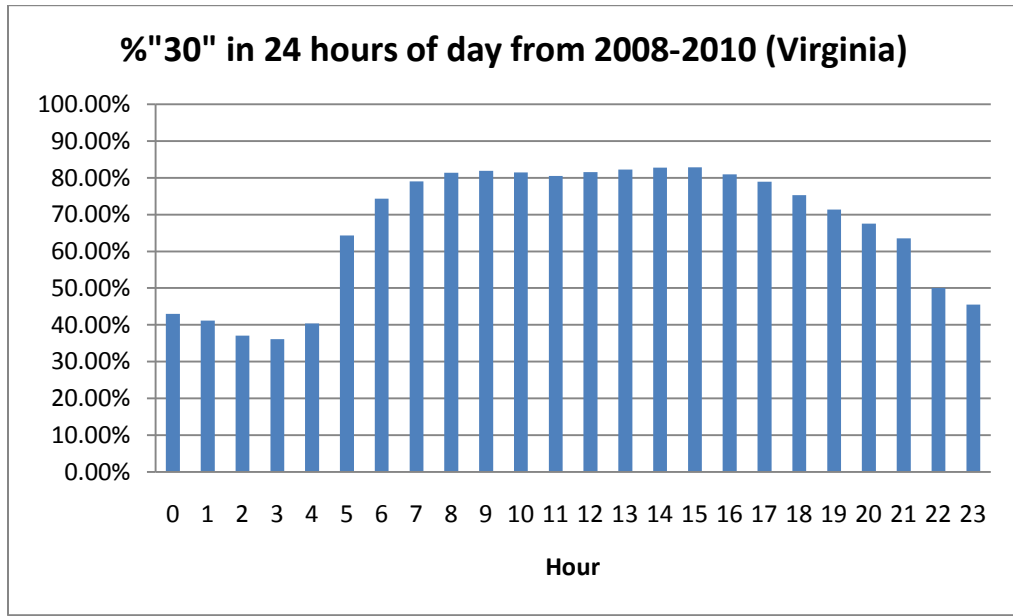


Figure 1(A). Percentage of score "30" from October 2008 to March 2010 during 24 hours in Virginia

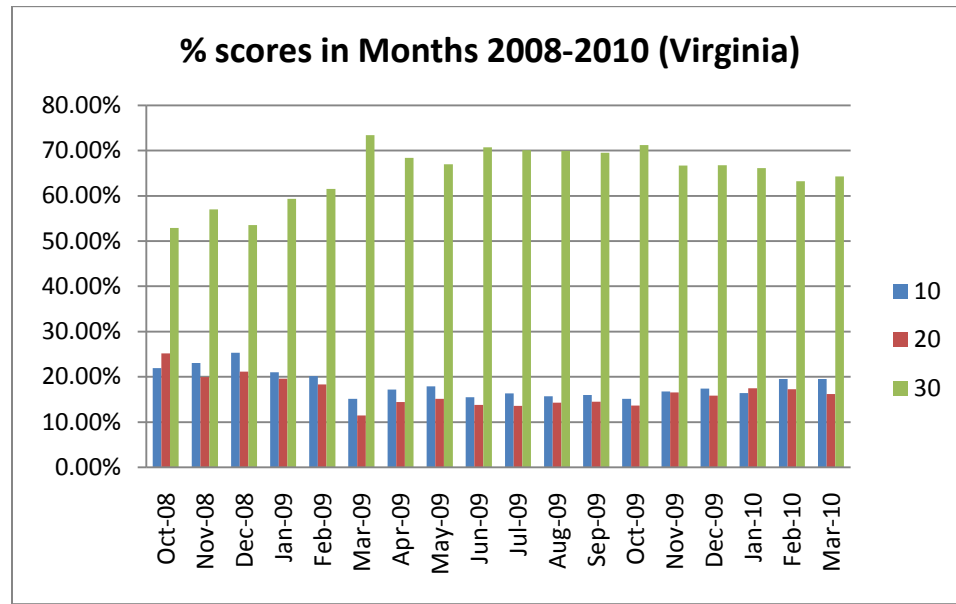


Figure 2(A). Percentage of all score from October 2008 to March 2010 in Virginia

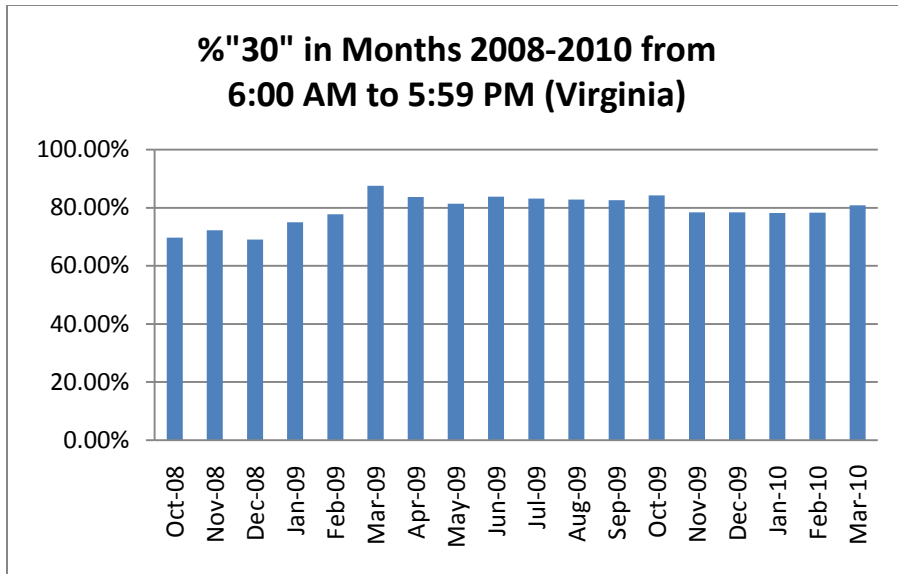


Figure 3(A). Percentage of score "30" from 6:00 AM to 5:59 PM, from October 2008 to March 2010 in Virginia

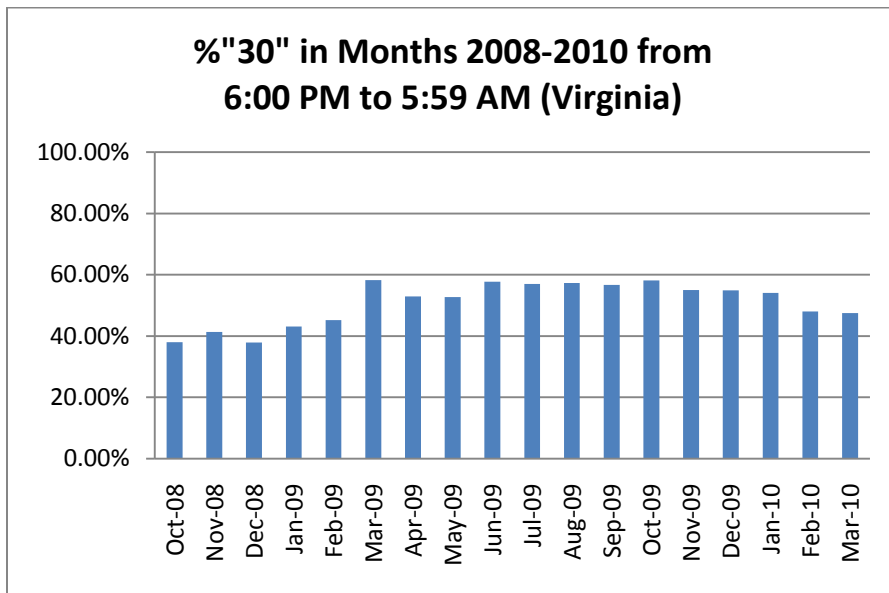


Figure 4(A). Percentage of score "30" from 6:00 PM to 5:59 AM, from October 2008 to March 2010 in Virginia

		Hour of Day																							
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Month - Year	Oct-08	20%	20%	18%	20%	23%	47%	57%	61%	64%	66%	69%	72%	71%	73%	73%	75%	74%	71%	65%	62%	53%	48%	32%	26%
	Nov-08	28%	27%	25%	26%	27%	53%	65%	72%	74%	74%	74%	73%	74%	72%	73%	74%	71%	71%	67%	61%	56%	50%	35%	31%
	Dec-08	26%	24%	24%	26%	27%	52%	61%	67%	70%	69%	70%	70%	70%	71%	73%	72%	69%	67%	60%	54%	52%	44%	32%	27%
	Jan-09	29%	27%	26%	29%	29%	55%	67%	74%	77%	77%	75%	75%	76%	78%	77%	77%	76%	72%	69%	63%	58%	52%	35%	32%
	Feb-09	31%	29%	27%	30%	30%	58%	72%	79%	79%	80%	77%	77%	77%	78%	81%	81%	78%	75%	71%	66%	60%	55%	39%	35%
	Mar-09	46%	43%	41%	36%	36%	68%	78%	84%	88%	89%	89%	88%	89%	90%	90%	90%	89%	86%	84%	81%	77%	71%	56%	49%
	Apr-09	43%	40%	35%	33%	33%	61%	74%	79%	86%	86%	85%	84%	85%	86%	86%	86%	85%	82%	78%	75%	70%	65%	51%	47%
	May-09	42%	41%	35%	34%	36%	62%	74%	80%	82%	84%	84%	81%	82%	83%	83%	83%	82%	80%	76%	75%	70%	66%	49%	45%
	Jun-09	47%	47%	43%	41%	47%	70%	80%	84%	85%	85%	84%	83%	84%	85%	85%	85%	84%	82%	78%	74%	72%	68%	55%	51%
	Jul-09	47%	46%	41%	40%	45%	69%	78%	82%	84%	85%	84%	83%	84%	85%	85%	85%	83%	81%	78%	74%	71%	68%	55%	50%
	Aug-09	50%	47%	43%	38%	45%	68%	76%	81%	83%	84%	84%	83%	85%	84%	85%	85%	83%	82%	77%	75%	71%	69%	56%	52%
	Sep-09	48%	45%	42%	41%	46%	67%	76%	81%	83%	84%	83%	82%	84%	84%	85%	85%	83%	80%	77%	74%	70%	65%	54%	50%
	Oct-09	50%	47%	42%	41%	48%	70%	79%	83%	84%	85%	85%	84%	85%	86%	86%	87%	85%	82%	79%	75%	71%	67%	57%	51%
	Nov-09	47%	45%	41%	40%	46%	65%	72%	77%	80%	79%	79%	79%	80%	80%	81%	80%	78%	77%	74%	70%	66%	63%	54%	50%
	Dec-09	47%	46%	40%	39%	47%	63%	73%	77%	79%	80%	79%	79%	79%	80%	81%	80%	78%	77%	74%	70%	66%	63%	54%	49%
	Jan-10	46%	44%	40%	39%	43%	62%	72%	76%	79%	80%	78%	78%	79%	81%	80%	81%	78%	77%	75%	69%	65%	63%	53%	49%
Feb-10	35%	34%	31%	30%	34%	61%	72%	76%	79%	79%	78%	78%	79%	80%	81%	81%	79%	77%	74%	70%	66%	62%	43%	37%	
Mar-10	33%	31%	28%	27%	34%	67%	76%	80%	82%	82%	81%	80%	81%	83%	84%	84%	81%	78%	73%	70%	67%	63%	41%	36%	

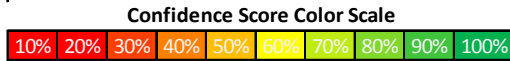


Figure 5(A). Percentage of score “30” from October 2008 to March 2010 during 24 hours in Virginia

(B) State of Pennsylvania

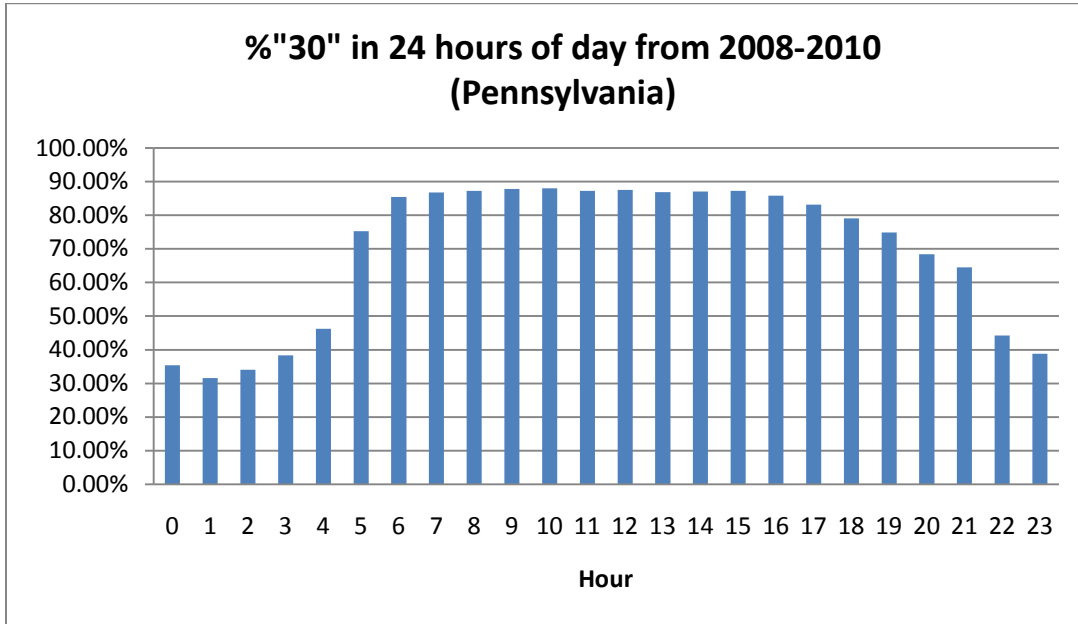


Figure 1(B). Percentage of score "30" from October 2008 to March 2010 during 24 hours in Pennsylvania

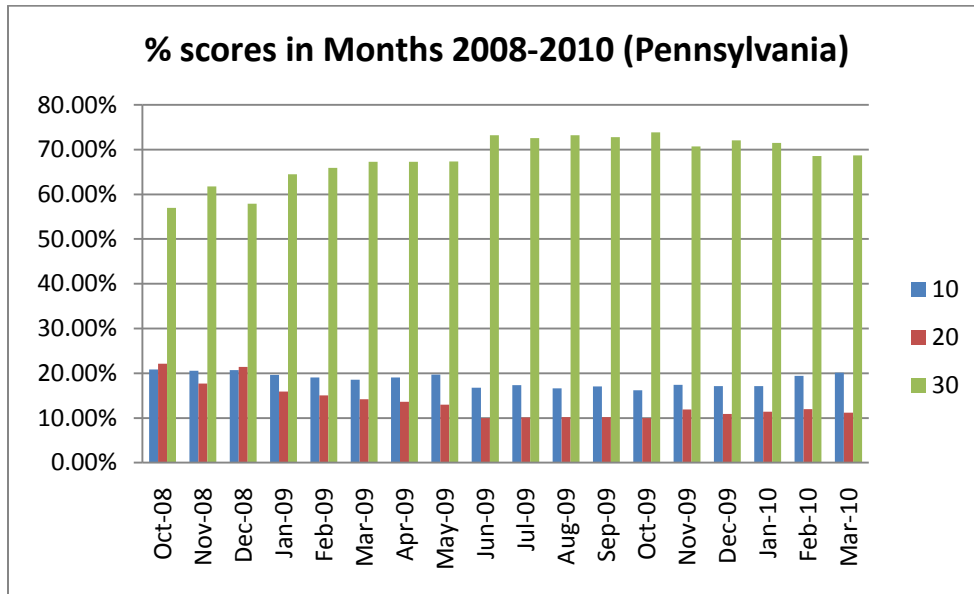


Figure 2(B). Percentage of all score from October 2008 to March 2010 in Pennsylvania

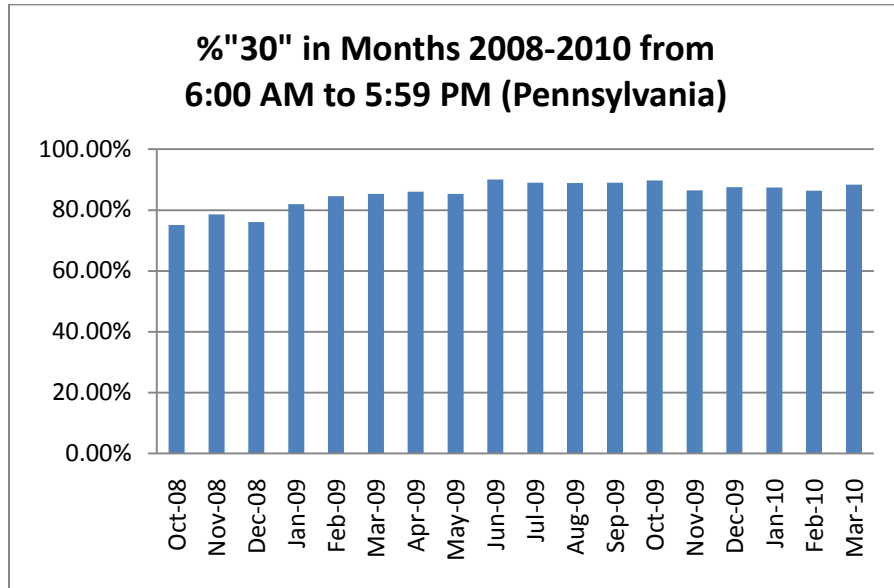


Figure 3(B). Percentage of score "30" from 6:00 AM to 5:59 PM, from October 2008 to March 2010 in Pennsylvania

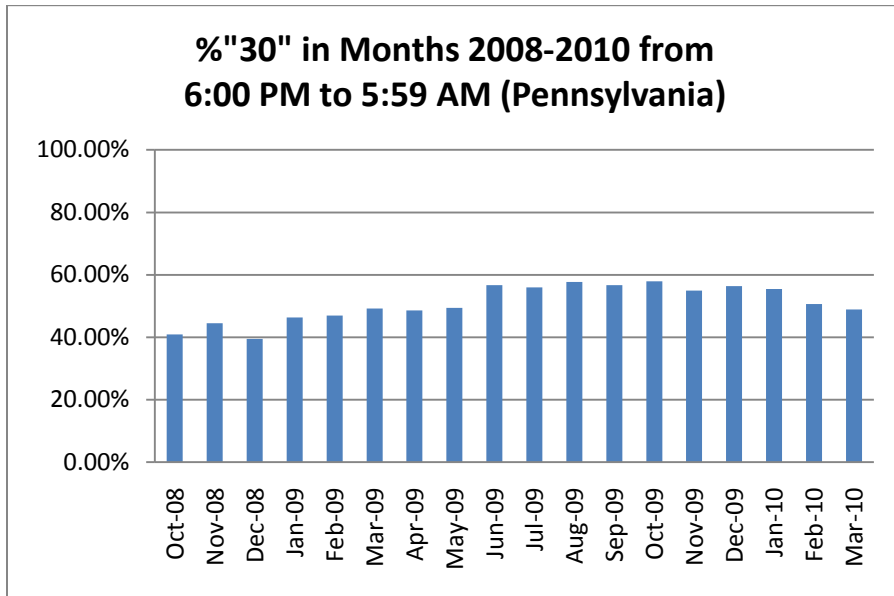


Figure 4(B). Percentage of score "30" from 6:00 PM to 5:59 AM, from October 2008 to March 2010 in Pennsylvania

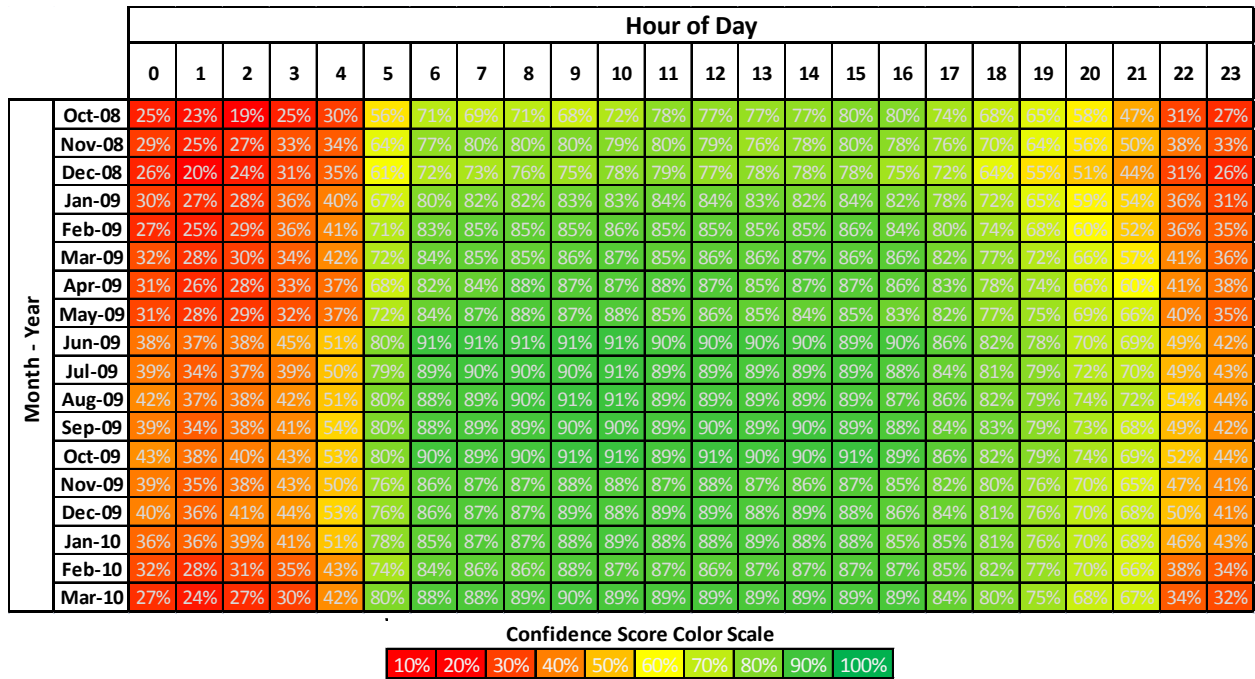


Figure 5(B). Percentage of score “30” from October 2008 to March 2010 during 24 hours in Pennsylvania

(C) State of New Jersey

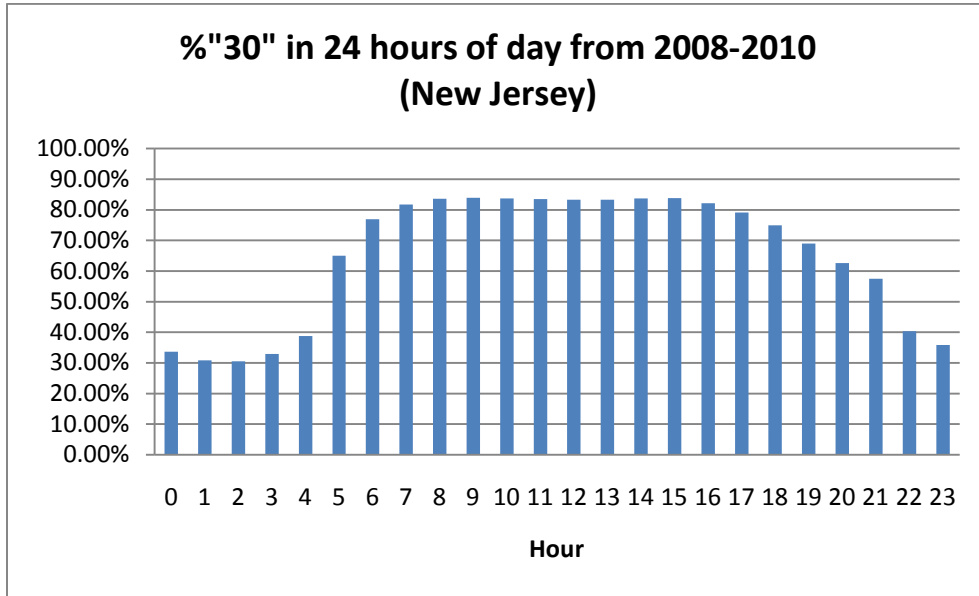


Figure 1(C). Percentage of score "30" from October 2008 to March 2010 during 24 hours in New Jersey

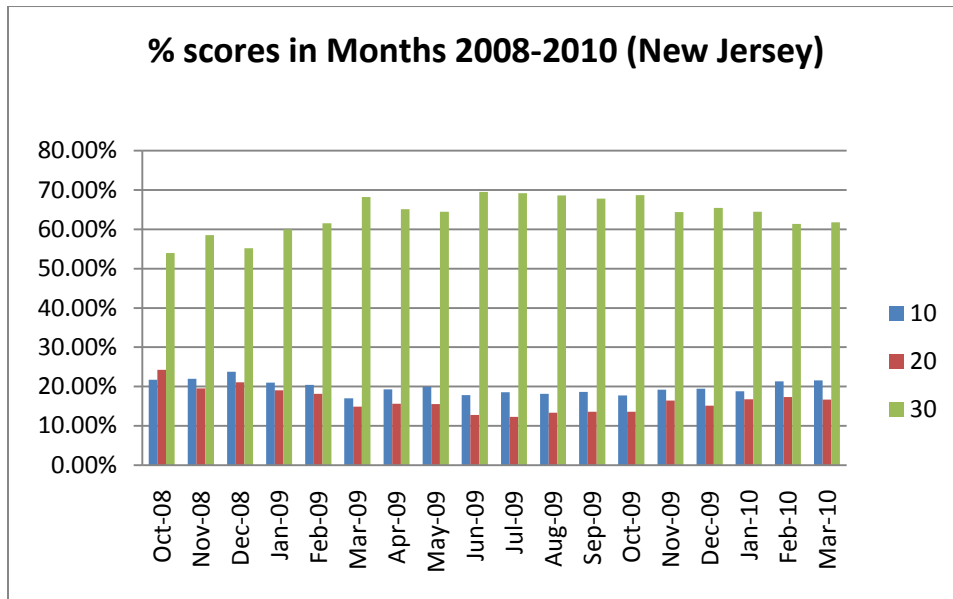


Figure 2(C). Percentage of all score from October 2008 to March 2010 in New Jersey

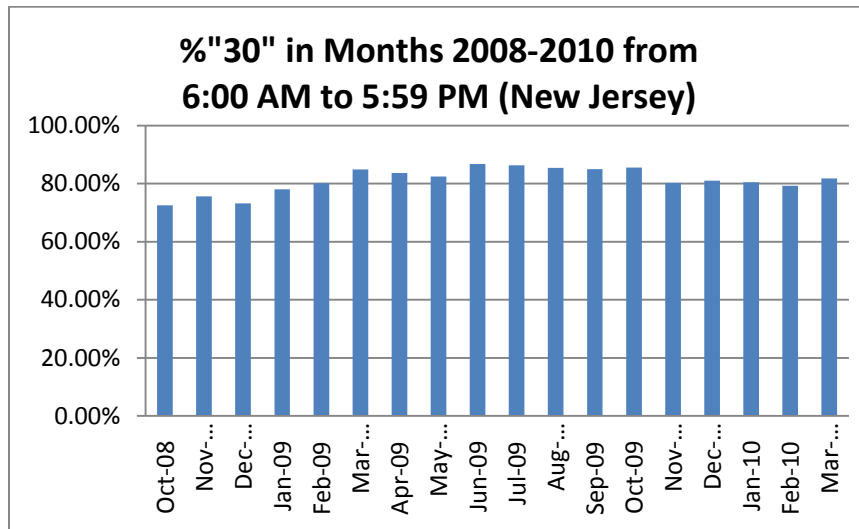


Figure 3(C). Percentage of score "30" from 6:00 AM to 5:59 PM, from October 2008 to March 2010 in New Jersey

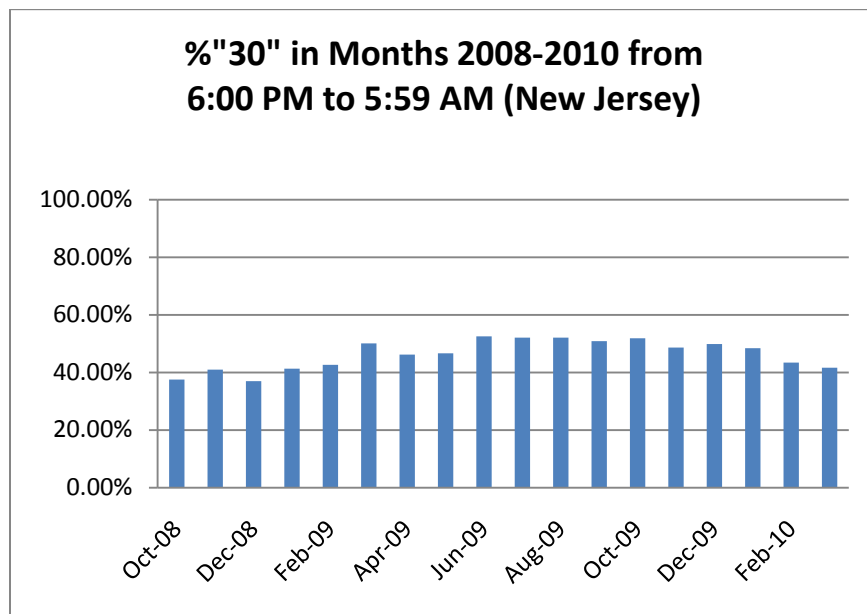


Figure 4(C). Percentage of score "30" from 6:00 PM to 5:59 AM, from October 2008 to March 2010 in New Jersey

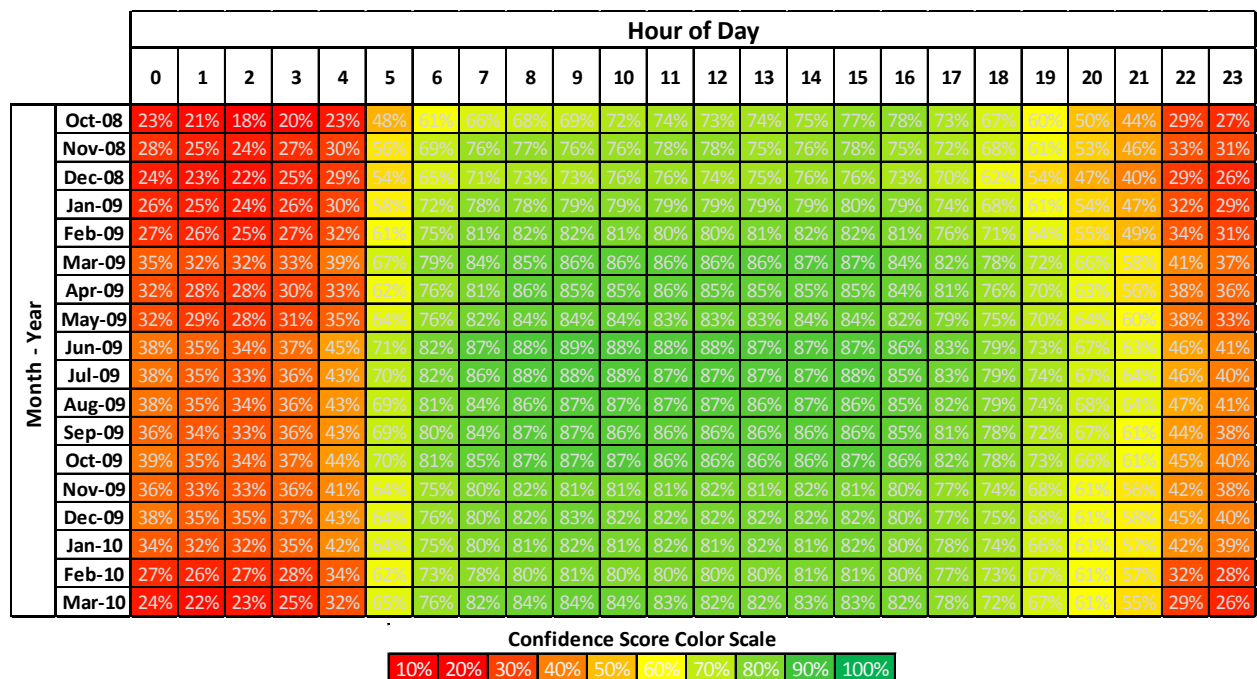


Figure 5(C). Percentage of score "30" from October 2008 to March 2010 during 24 hours in New Jersey

(D) State of North Carolina

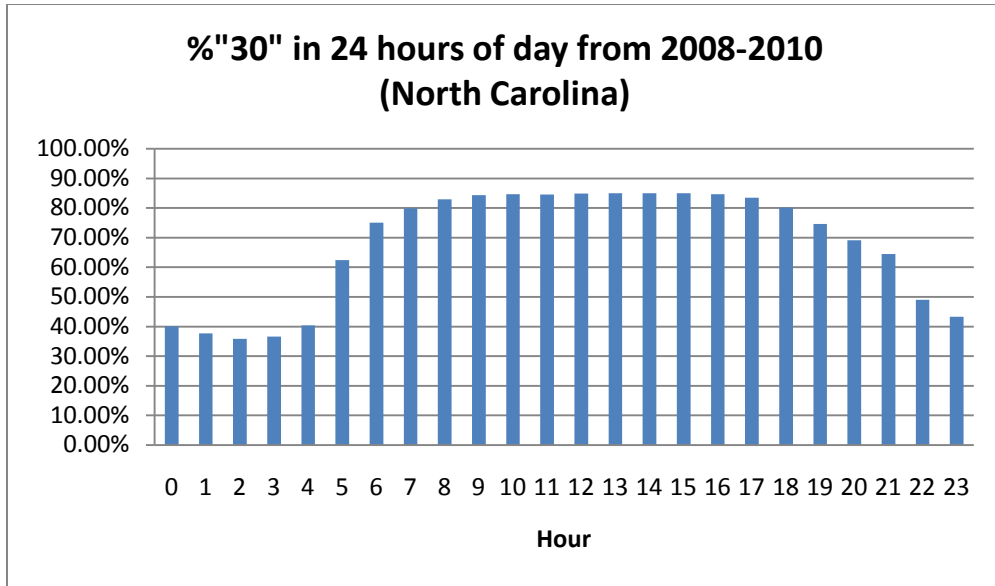


Figure1 (D). Percentage of score "30" from October 2008 to March 2010 during 24 hours in North Carolina

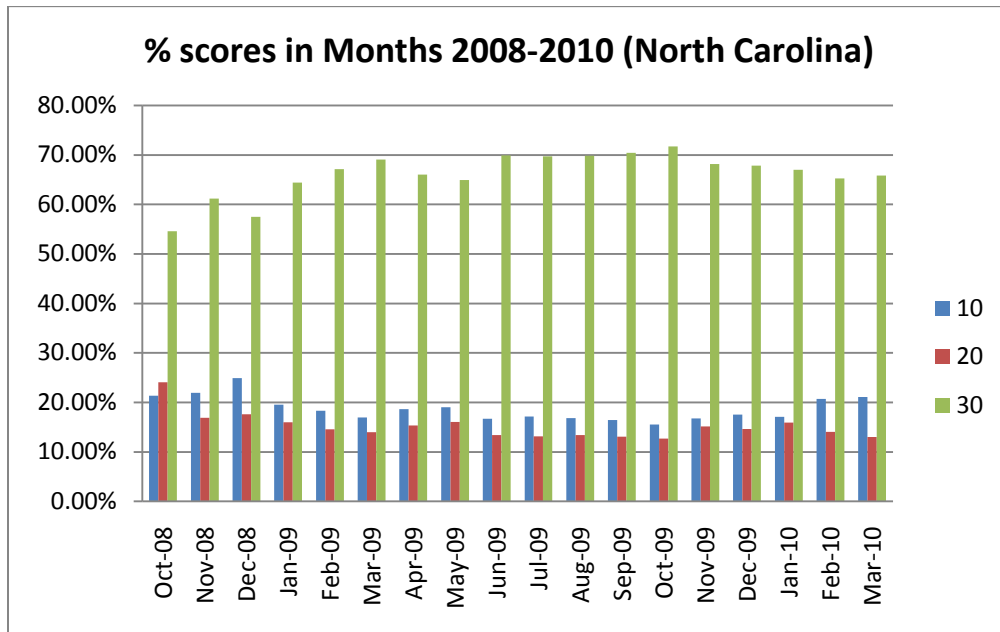


Figure 2(D). Percentage of all score from October 2008 to March 2010 in North Carolina

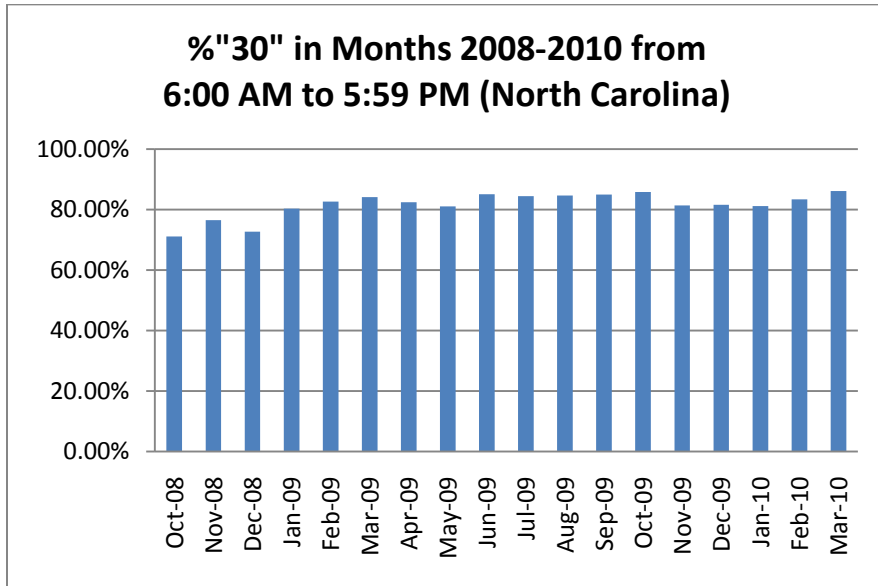


Figure 3(D). Percentage of score "30" from 6:00 AM to 5:59 PM, from October 2008 to March 2010 in North Carolina

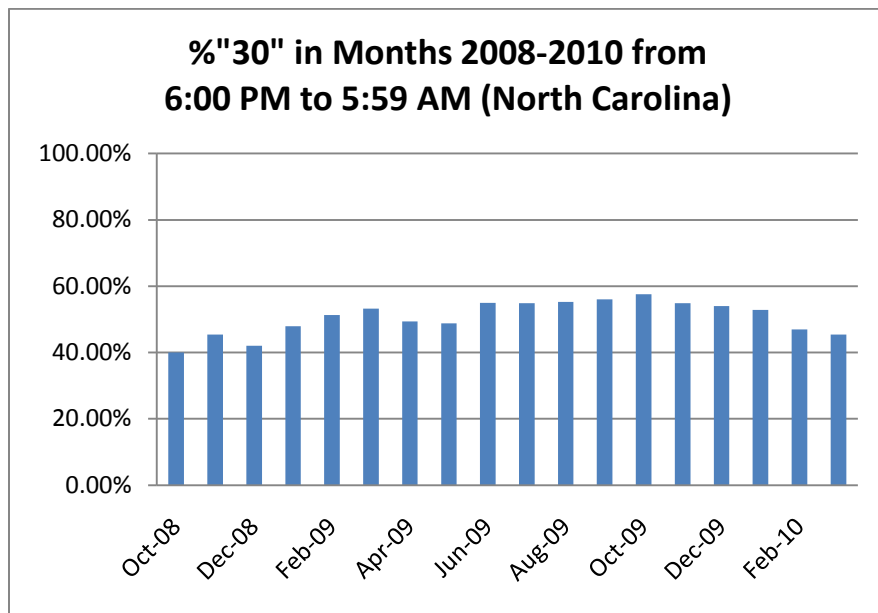


Figure 4(D). Percentage of score "30" from 6:00 PM to 5:59 AM, from October 2008 to March 2010 in North Carolina

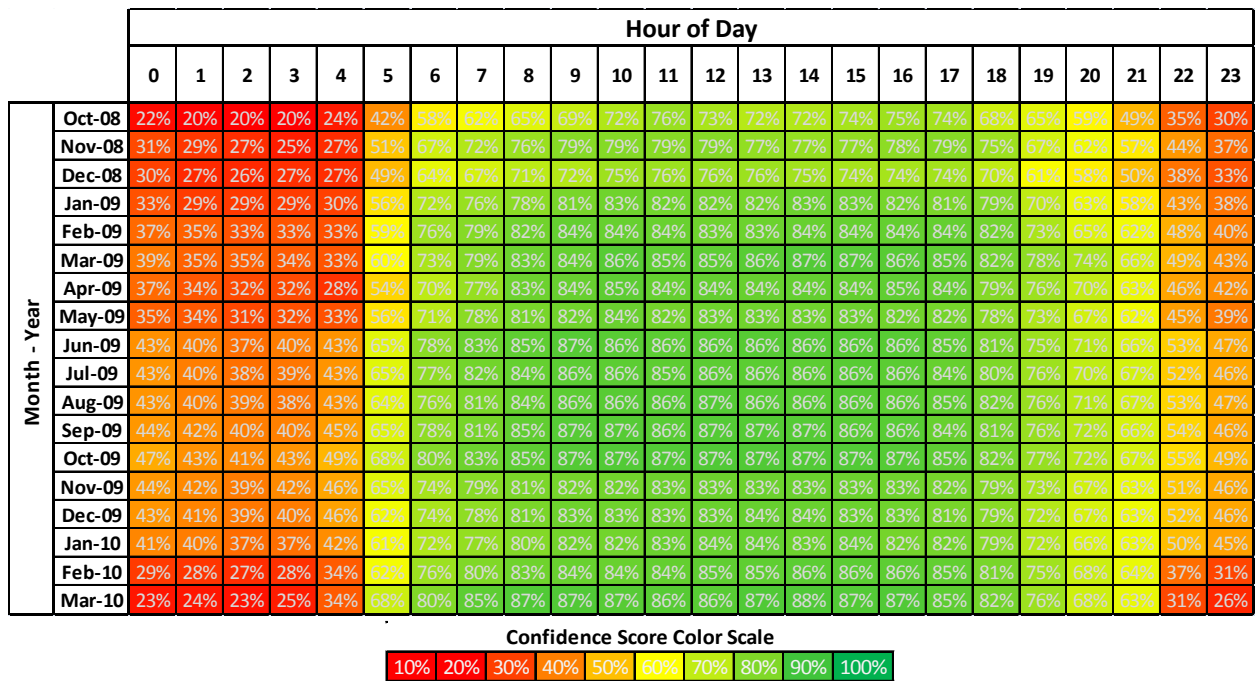


Figure 5(D). Percentage of score “30” from October 2008 to March 2010 during 24 hours in North Carolina

(E) State of Delaware

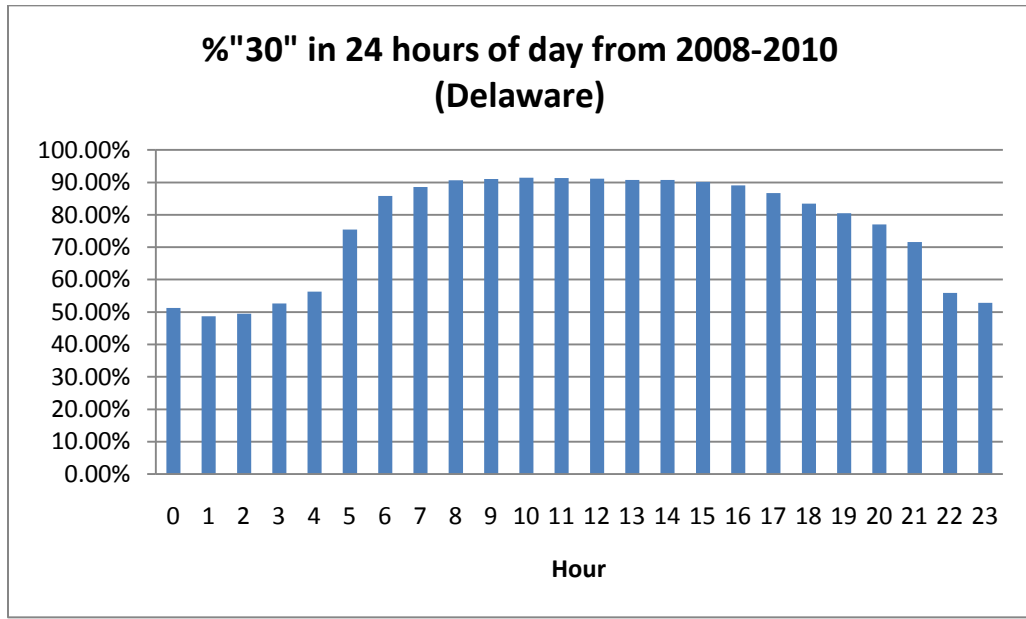


Figure 1(E). Percentage of score "30" from October 2008 to March 2010 during 24 hours in Delaware

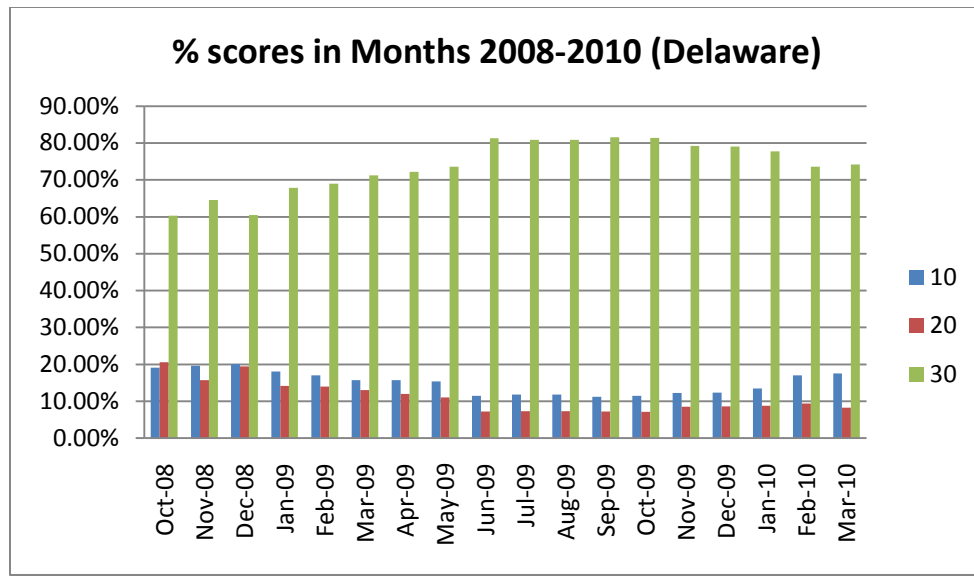


Figure 2(E). Percentage of all score from October 2008 to March 2010 in Delaware

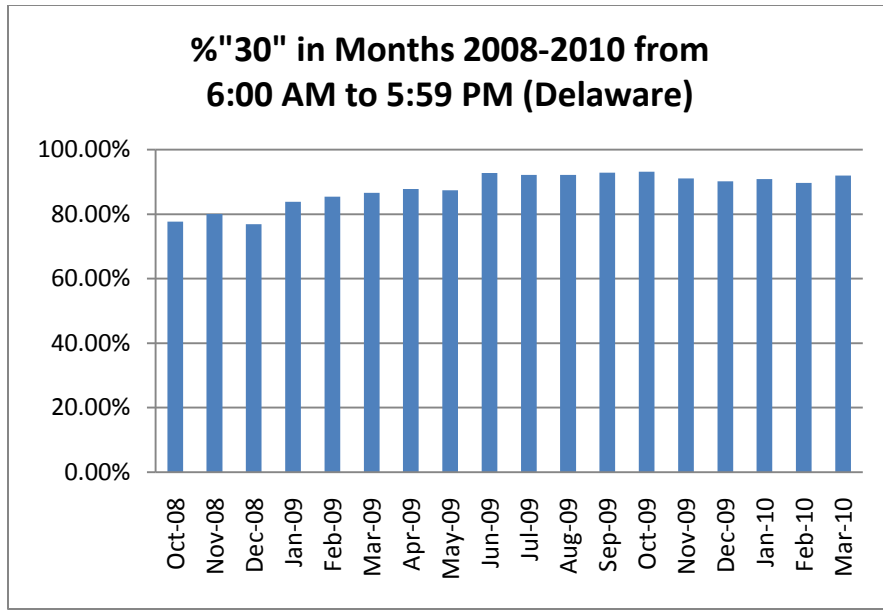


Figure 3(E). Percentage of score "30" from 6:00 AM to 5:59 PM, from October 2008 to March 2010 in Delaware

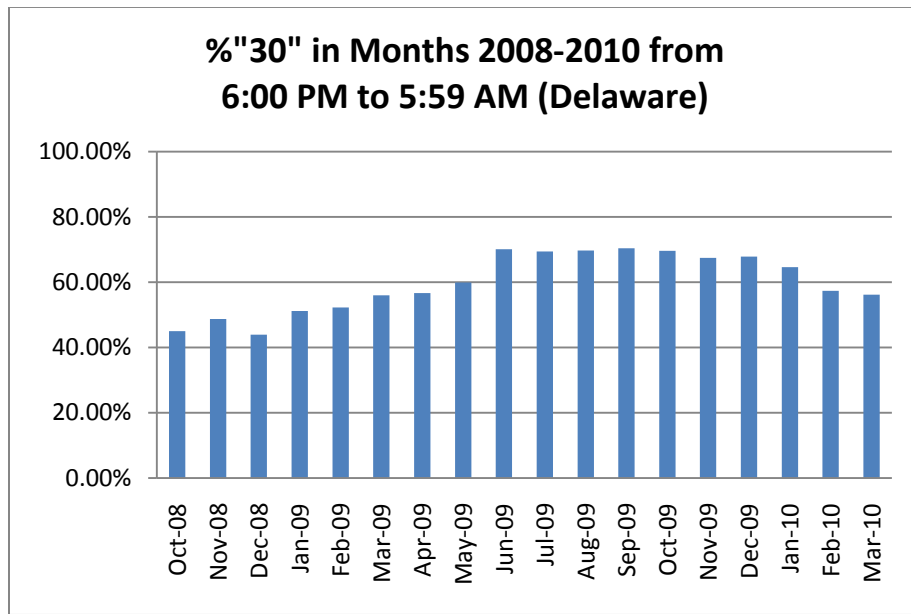


Figure 4(E). Percentage of score "30" from 6:00 PM to 5:59 AM, from October 2008 to March 2010 in Delaware

		Hour of Day																							
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Month - Year	Oct-08	29%	30%	26%	33%	32%	48%	66%	67%	73%	66%	75%	83%	83%	82%	82%	82%	83%	76%	72%	67%	61%	51%	36%	36%
	Nov-08	33%	33%	34%	39%	39%	58%	75%	80%	82%	82%	81%	82%	82%	78%	78%	82%	81%	78%	73%	66%	63%	54%	45%	40%
	Dec-08	30%	29%	30%	37%	38%	56%	68%	72%	77%	76%	80%	82%	79%	80%	80%	79%	76%	74%	67%	61%	55%	46%	38%	33%
	Jan-09	39%	34%	33%	41%	42%	62%	77%	81%	85%	84%	86%	87%	86%	86%	85%	86%	84%	80%	75%	69%	65%	56%	46%	40%
	Feb-09	39%	36%	35%	43%	46%	65%	80%	82%	86%	87%	88%	88%	88%	88%	88%	86%	86%	80%	75%	70%	65%	55%	46%	43%
	Mar-09	46%	38%	40%	44%	49%	67%	82%	84%	86%	87%	88%	88%	88%	88%	90%	89%	87%	83%	79%	75%	72%	61%	49%	47%
	Apr-09	45%	38%	42%	46%	44%	64%	80%	84%	90%	90%	90%	90%	90%	88%	89%	90%	88%	86%	80%	79%	75%	64%	51%	51%
	May-09	46%	46%	44%	48%	49%	72%	83%	87%	89%	89%	91%	89%	89%	88%	87%	88%	85%	84%	84%	82%	76%	72%	51%	49%
	Jun-09	59%	58%	61%	62%	66%	83%	91%	93%	94%	94%	94%	93%	93%	94%	93%	92%	93%	91%	86%	86%	82%	77%	61%	60%
	Jul-09	59%	56%	60%	59%	64%	80%	91%	93%	94%	93%	93%	93%	93%	93%	92%	91%	91%	89%	86%	85%	82%	78%	63%	60%
	Aug-09	58%	58%	59%	60%	63%	80%	89%	91%	94%	94%	94%	93%	93%	93%	93%	92%	91%	89%	89%	86%	83%	78%	65%	59%
	Sep-09	61%	58%	61%	63%	65%	82%	90%	92%	95%	95%	94%	94%	94%	93%	95%	93%	92%	89%	87%	84%	81%	76%	64%	62%
	Oct-09	59%	55%	54%	63%	66%	81%	91%	92%	94%	94%	95%	93%	95%	95%	94%	93%	92%	89%	87%	84%	81%	78%	66%	61%
	Nov-09	57%	56%	56%	61%	64%	81%	87%	91%	92%	91%	92%	93%	93%	92%	92%	91%	91%	88%	83%	82%	78%	74%	61%	58%
	Dec-09	57%	55%	57%	56%	65%	77%	86%	89%	90%	92%	92%	92%	92%	92%	92%	91%	89%	87%	85%	82%	79%	78%	65%	59%
	Jan-10	53%	52%	50%	53%	58%	78%	87%	90%	90%	93%	92%	93%	92%	93%	92%	92%	89%	88%	85%	81%	77%	75%	58%	55%
	Feb-10	44%	41%	39%	41%	47%	75%	85%	88%	90%	91%	91%	91%	91%	91%	90%	91%	90%	88%	84%	82%	78%	74%	45%	42%
	Mar-10	40%	37%	35%	40%	48%	80%	89%	92%	92%	94%	94%	93%	93%	93%	93%	92%	91%	88%	85%	79%	79%	74%	41%	38%

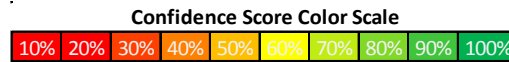


Figure 5(E). Percentage of score “30” from October 2008 to March 2010 during 24 hours in Delaware