Vermont Forensic Laboratory
Blood and Breath Alcohol Testing

Overview

* Senior Forensic Chemist / Alcohol Section Supervisor
* Two Forensic Chemists
* DMT Technician
* Evidence Technician / Administrative Assistant

Overview

* Blood Alcohol Analysis by GC/FID
* DMT Evidential Breath Alcohol Instrument Oversight
  * Calibration, Certification, Repair and Officer Training
* Alcohol Physiology, Pharmacology, Testing and Impairment Expert Testimony

Expert Testimony

* 2014: 517 Affidavit requests, 39* hearings/trials
* 2015: 419 Affidavit requests, 38 hearings/trials
* 2016 to date: 210 Affidavit requests, 8 hearings/trials

*105 subpoenas

Blood Testing

* Blood alcohol analyzed by gas chromatography with dual flame ionization detection.
* Perkin Elmer GC-FID and TurboMatrix 110 autosampler purchased in 2015 with GHSP grant.

Blood Testing

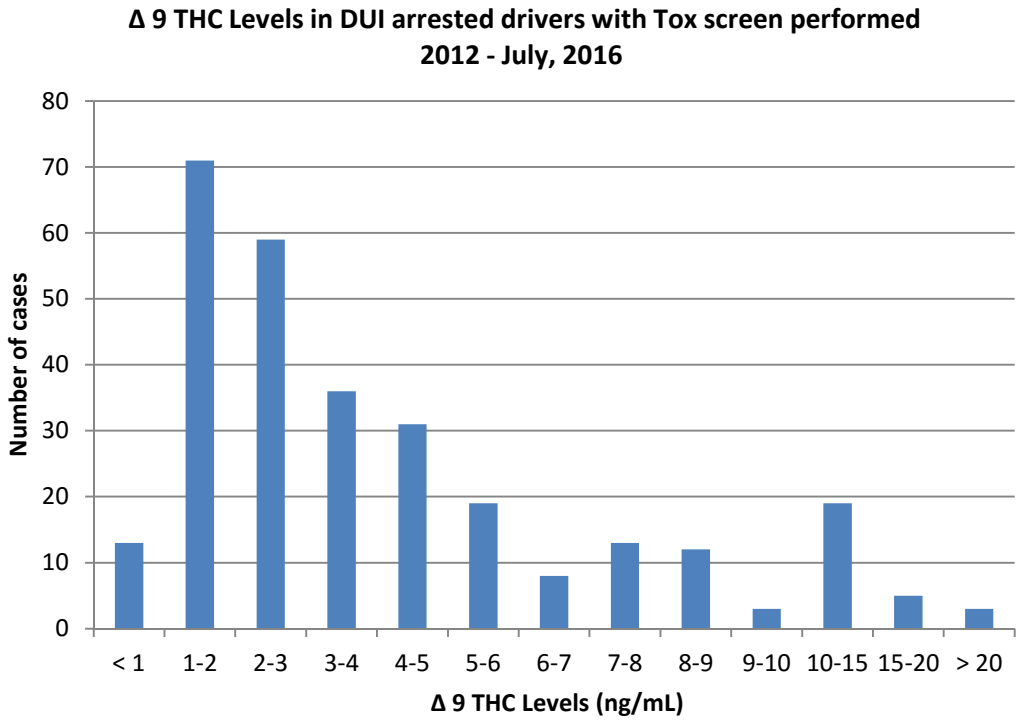
* 2014
  * 150 blood-alcohol samples analyzed by VFL
  * 158 blood-drug samples sent to NMS for analysis
* 2015
  * 180 blood-alcohol samples analyzed by VFL
  * 191 blood-drug samples sent to NMS for analysis
* 2016 (thru 6/30)
  * 85 blood-alcohol samples analyzed by VFL
  * 104 blood-drug samples sent to NMS for analysis

Blood Testing

Classes of Frequently Found Drugs*					
	2016			2015	
Drug Class	Number of cases	% of total		Number of cases	% of Total
Cannabis	148	42.4%		212	41.3%
Narcotic Analgesics--Opiates	33	9.5%		57	11.1%
Narcotic Analgesics--Synthetics	25	7.2%		23	4.5%
CNS Depressants--Anti-Anxiety Tranquilizers	32	9.2%		133	25.9%
CNS Depressants--Anti-Depressants	28	8.0%		36	7.0%
CNS Depressants--Non-barbiturates		0.0%		7	1.4%
CNS Stimulants--Cocaine	10	2.9%		17	3.3%
CNS Stimulants--Amphetamines		0.0%		13	2.5%
Other		0.0%		15	2.9%
*Each case may have more than 1 drug per class i.e. Delta-9 Carboxy and Delta-9 THC will count as 2					

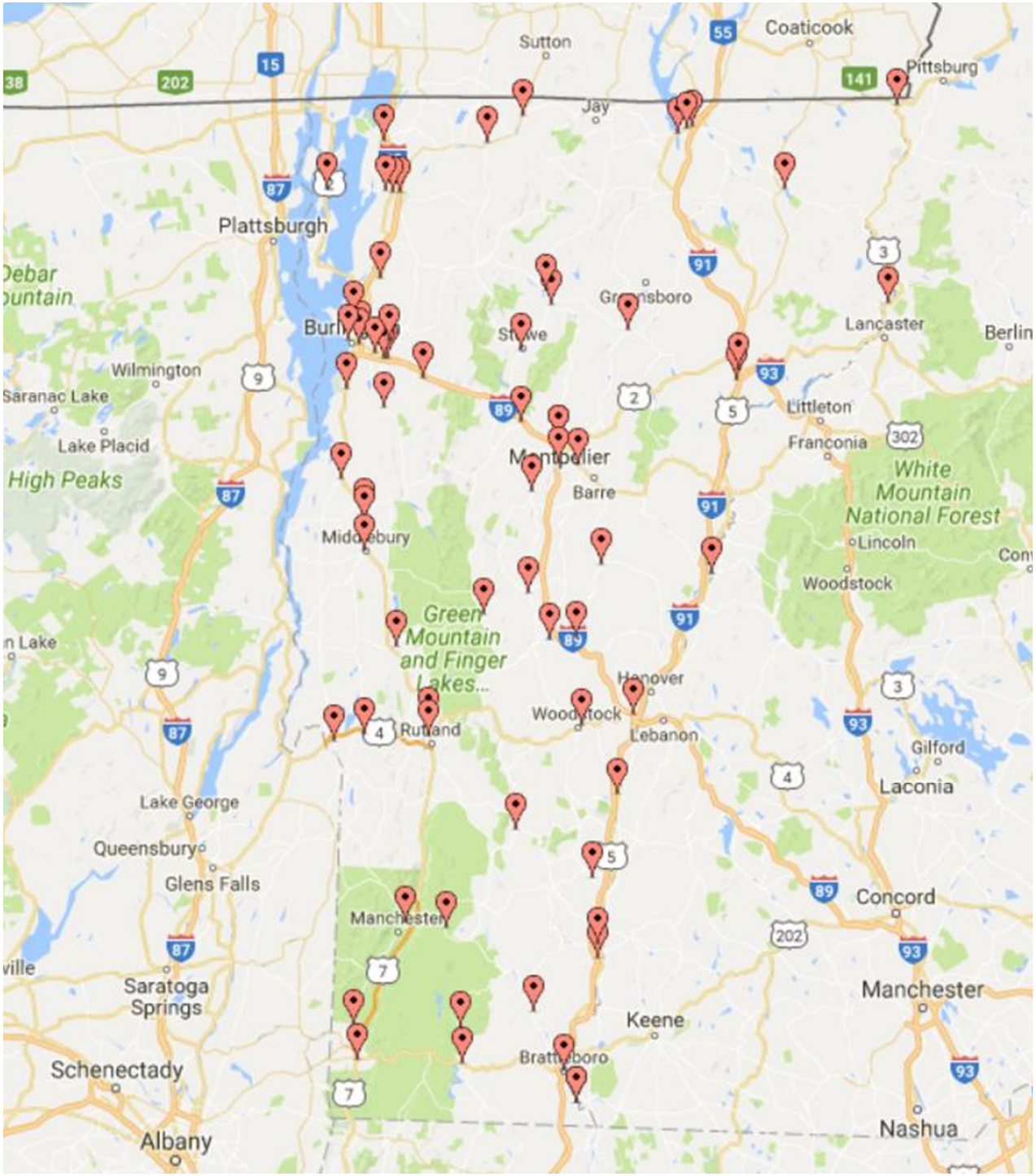
Top Drugs Found in NMS testing 2015-2016				
Top 20 Drugs Found in 2016			**Top 25 Drugs Found in 2015**	
Delta-9 Carboxy THC	54		Delta-9 Carboxy THC	102
Delta-9 THC	53		Delta-9 THC	80
11-Hydroxy Delta-9 THC	41		Morphine-Free	37
Morphine-Free	15		Clonazepam	34
Lorazepam	13		7-Amino Clonazepam	34
Benzoylecgonine	10		11-Hydroxy Delta-9 THC	30
Clonazepam	8		Alprazolam	19
7-Amino Clonazepam	7		Benzoylecgonine	17
Fentanyl	7		Diazepam	14
Hydroxybupropion	7		Nordiazepam	14
Methadone	7		Amphetamine	13
Oxycodone-Free	7		Oxycodone-Free	12
Codeine-Free	6		Lorazepam	11
Fluoxetine	6		Methadone	9
Norfentanyl	6		Fluoxetine	9
Norfluoxetine	6		Norfluoxetine	9
Bupropion	5		Lamotrigine	9
EDDP	5		Codeine-Free	8
Oxymorphone-Free	5		Fentanyl	7
Alprazolam	4		Norfentanyl	7
Trazodone	4		Zolpidem	7
			Oxazepam	7
			Hydroxybupropion	6
			Chlorpheniramine	6
			O-desmethylvenlafaxine	6
			Venlafaxine	6
Times top 20 drug identified	276		Times top 25 drug identified	513
Total drugs 2016	349		Total Compounds in 2015	633
Total Cases in 2016	103		Total Cases in 2015	191

THC Results from NMS Testing							
	Combined Data	**2012**	**2013**	**2014**	**2015**	**2016**	**THC Only**
Total Positives	292	29	63	67	80	53	151
Average Δ 9 THC	4.32	3.69	3.99	4.55	3.69	5.74	4.85
Median	3.1	3.5	3.2	3.1	2.45	3.6	3.6
Min	0.61	1	1	1	0.61	0.68	0.68
Max	24	10	10	17	24	24	24
Number tests ≥ 5 ng/mL	82	6	17	19	19	21	52
% tests ≥ 5 ng/mL	28.1%	20.7%	27.0%	28.4%	23.8%	39.6%	34.4%
Number tests ≥ 2.5 ng/mL	179	18	44	43	19	34	101
% tests ≥ 2.5 ng/mL	61.3%	62.1%	69.8%	64.2%	23.8%	64.2%	66.9%
# times THC tested for	728	*estimate based on 8150 and 8071 panels from NMS summary					
% positive	40.1%						



Breath Testing

* 79 DMT evidential infrared breath testing instruments
* 68 agencies operating DMTs in the field
* Most instruments purchased with GHSP grant funds
* 2015: software update to allow Ethernet connection and HOST data storage (complete)
* 2016: simulator replacement and hardware upgrade (in process)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Coaticook
Pittsburg
Jay
Plattsburgh
Wilmington
Saranac Lake
Lake Placid
High Peaks
Montpelier
Barre
Middlebury
Green Mountain and Finger Lakes...
Rutland
Woodstock
Hanover
Lebanon
Lancaster
Berlin
Littleton
Franconia
White Mountain National Forest
Lincoln
Woodstock
Gilford
Laconia
Lake George
Queensbury
Glens Falls
Saratoga Springs
Schenectady
Albany
Manchester
Keene
Concord
Manchester
Nashua

Breath Testing Data Analysis

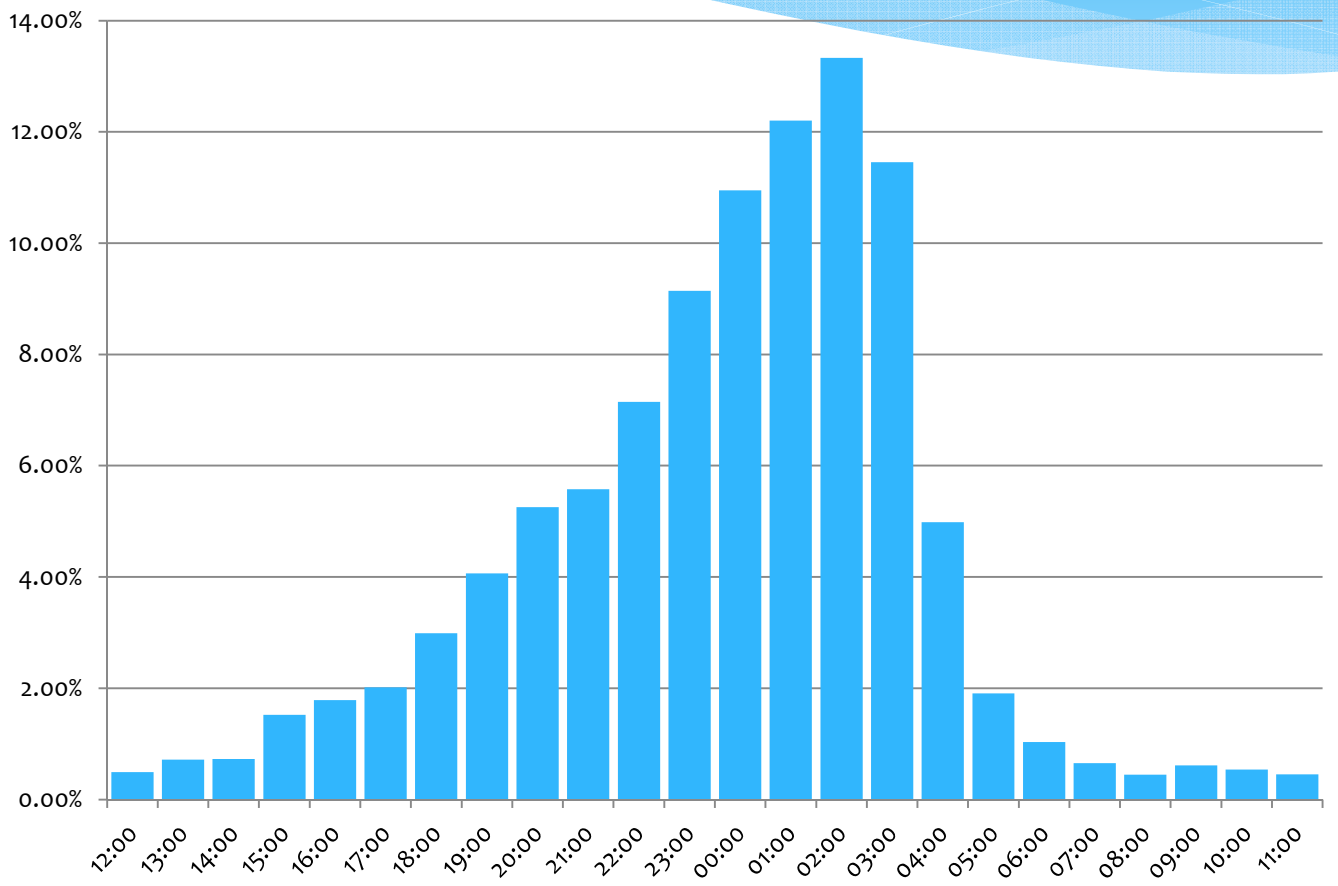
* Data from September 2011 – June 2016
* Attempt to remove training, testing, and troubleshooting results from true data
* >10,000 test results

No Result Tests

* Instrument error: 14.3%
  * Simulator out of range: 5.4%
  * Blank Error/Ambient Fail: 1.25%
* Sample error: 8.5%
  * Incomplete: 5.9%
  * Invalid sample rate: 1.4%
  * Interference rate: 0.8%
  * Suck back error 0.2%
* Refusal rate: 15%*

*Data based on total number of “refused” tests; may include tests classified as refusal due to observation period restart etc.

Time of Day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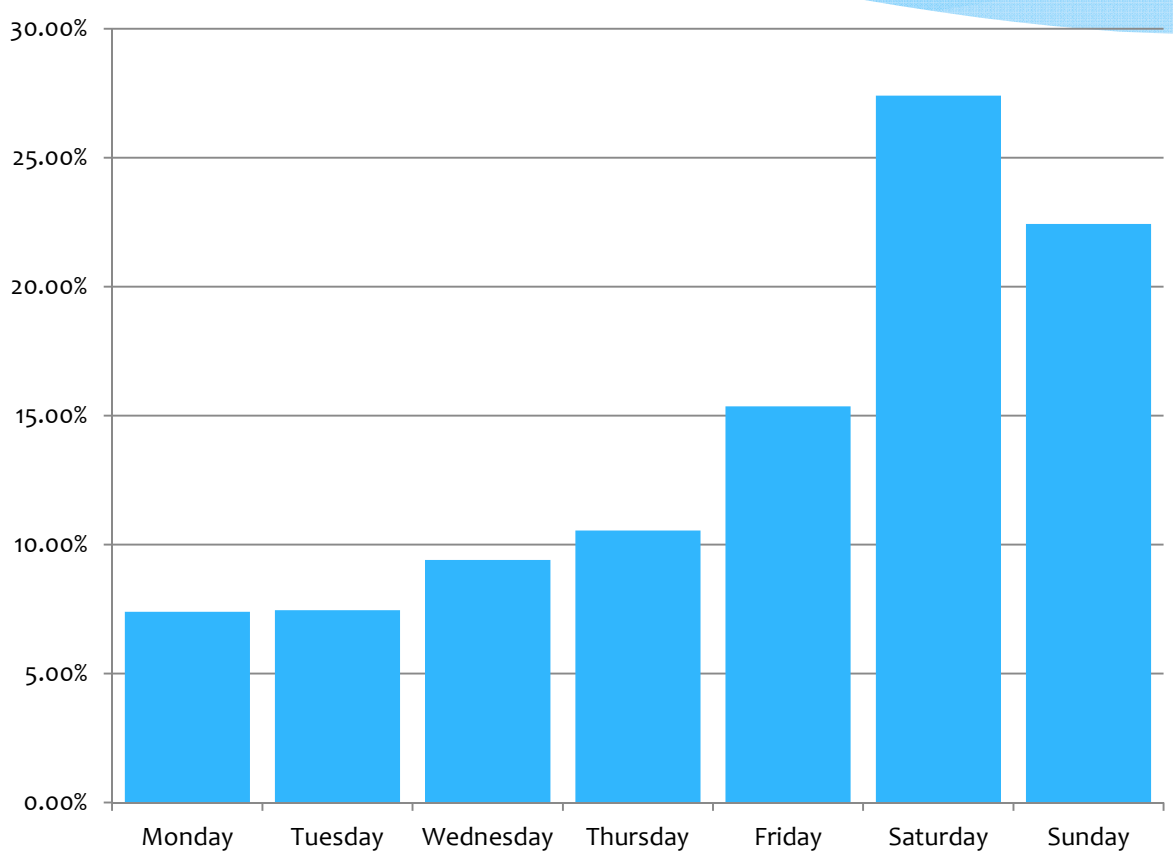
Day of Week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Monday
Tuesday
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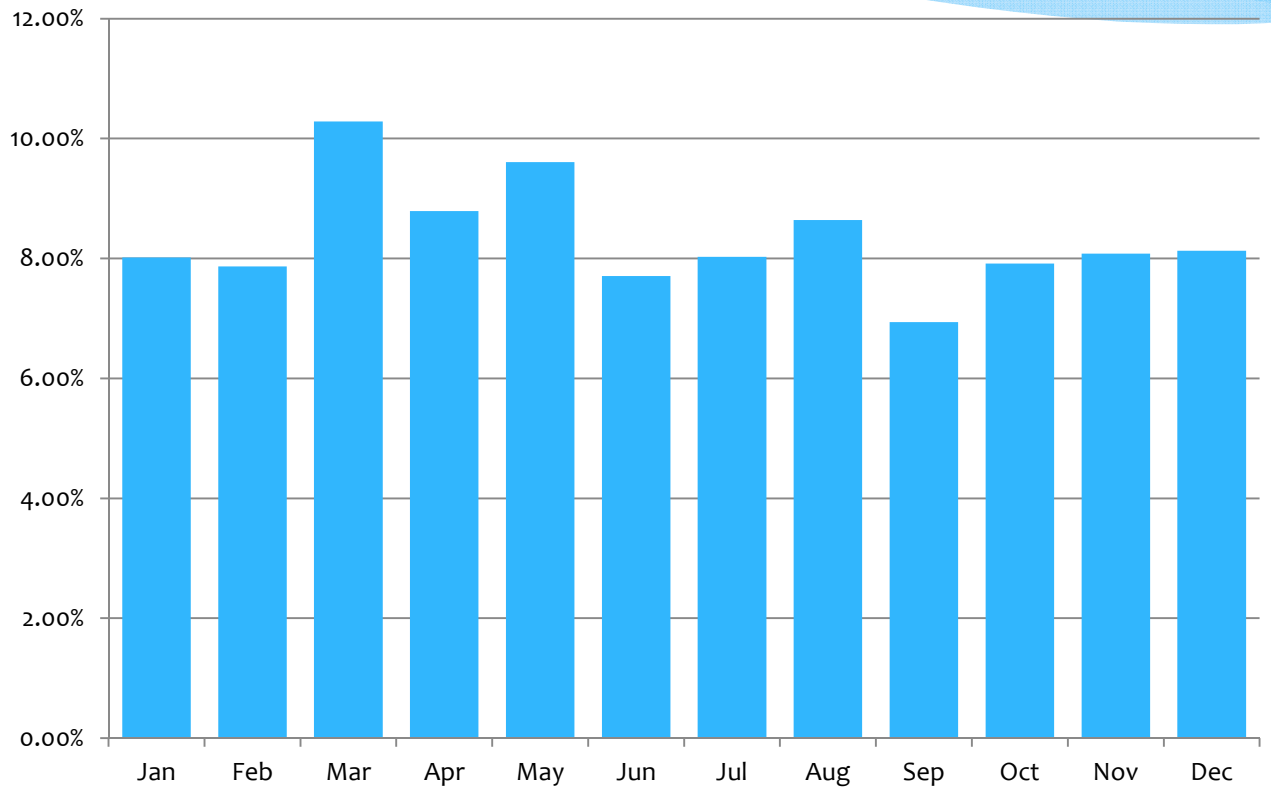
Saturday
Sunday

Month of Year

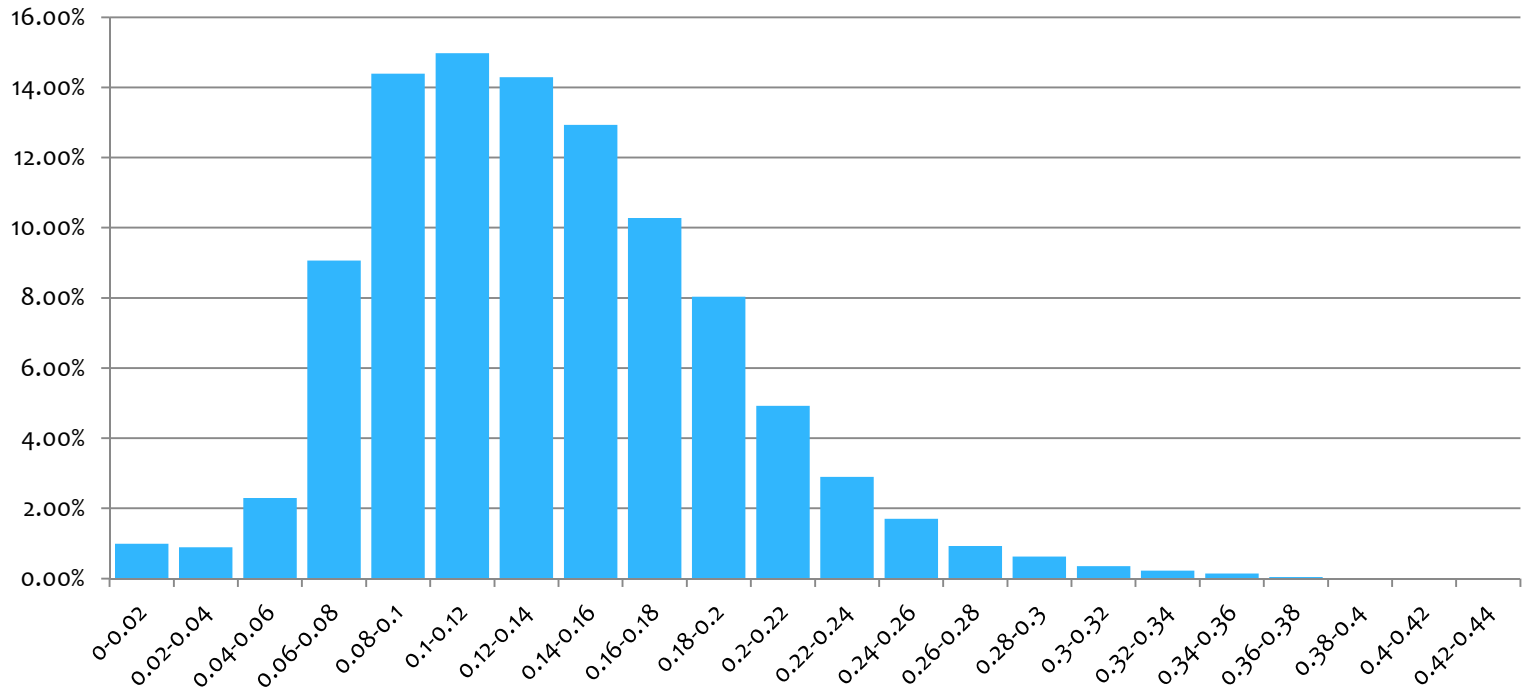


Holidays and Weekends

* Highest daily test average, 2012-2016:
  * Jan 1: 16.8
  * Nov 1: 14
  * Mar 17: 13.8
* Highest one-day overall:
  * Sunday, March 17, 2013: 28
* Average weekend: ~28 tests
* Highest weekend overall:
  * Oct 30 – Nov 1, 2015: 56

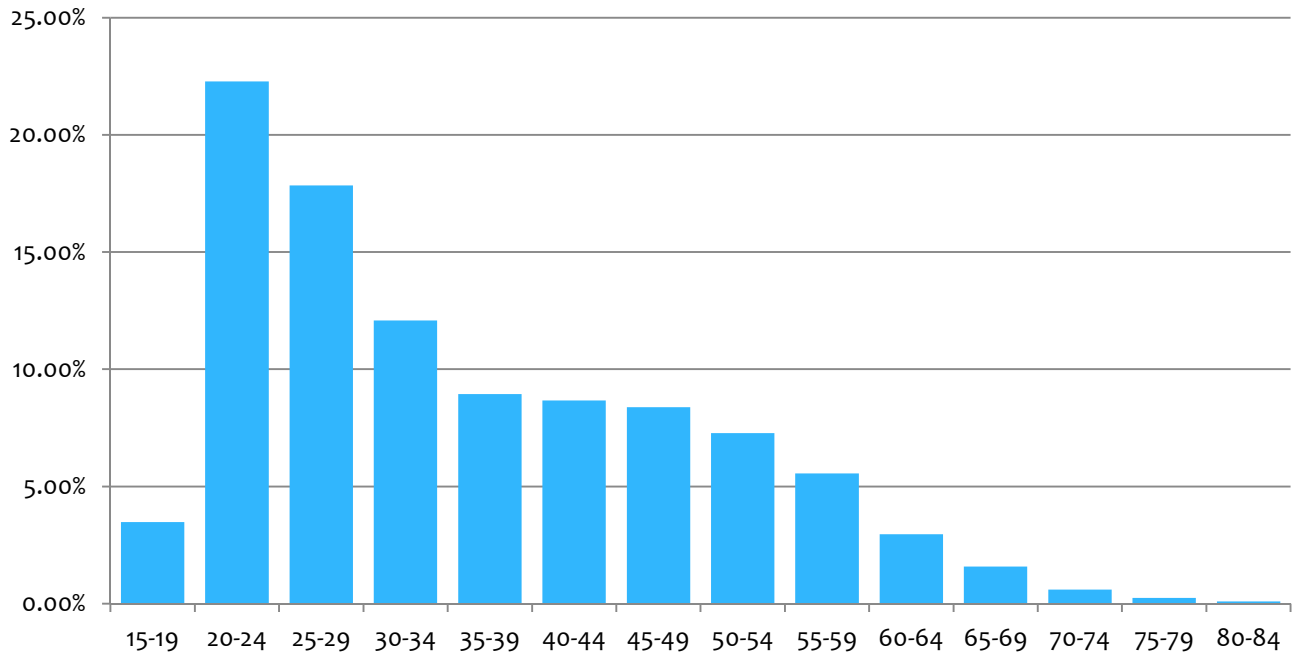
Test Results

Average BrAC:
0.136 (mean)
0.130 (median)
Highest result: 0.435



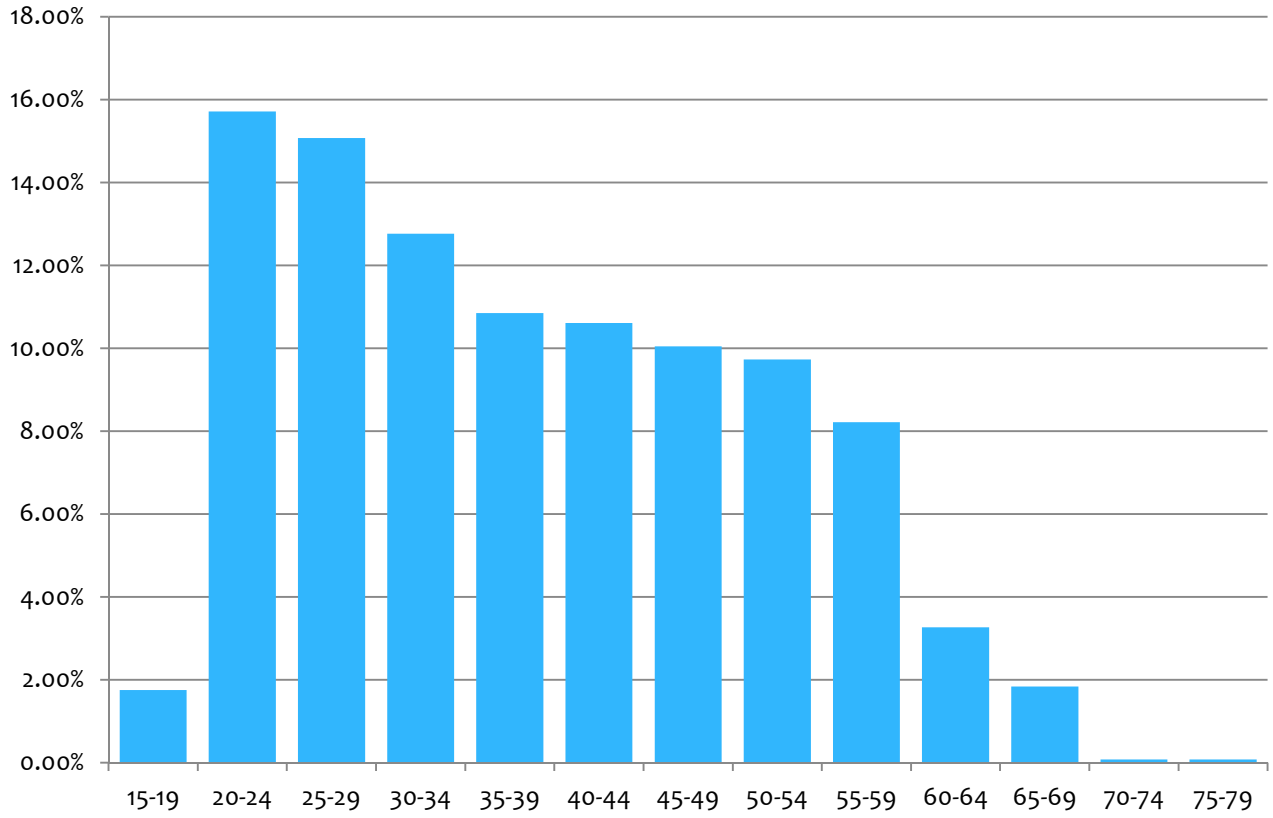
Demographics

* ~75% male, 25% female
* Age:

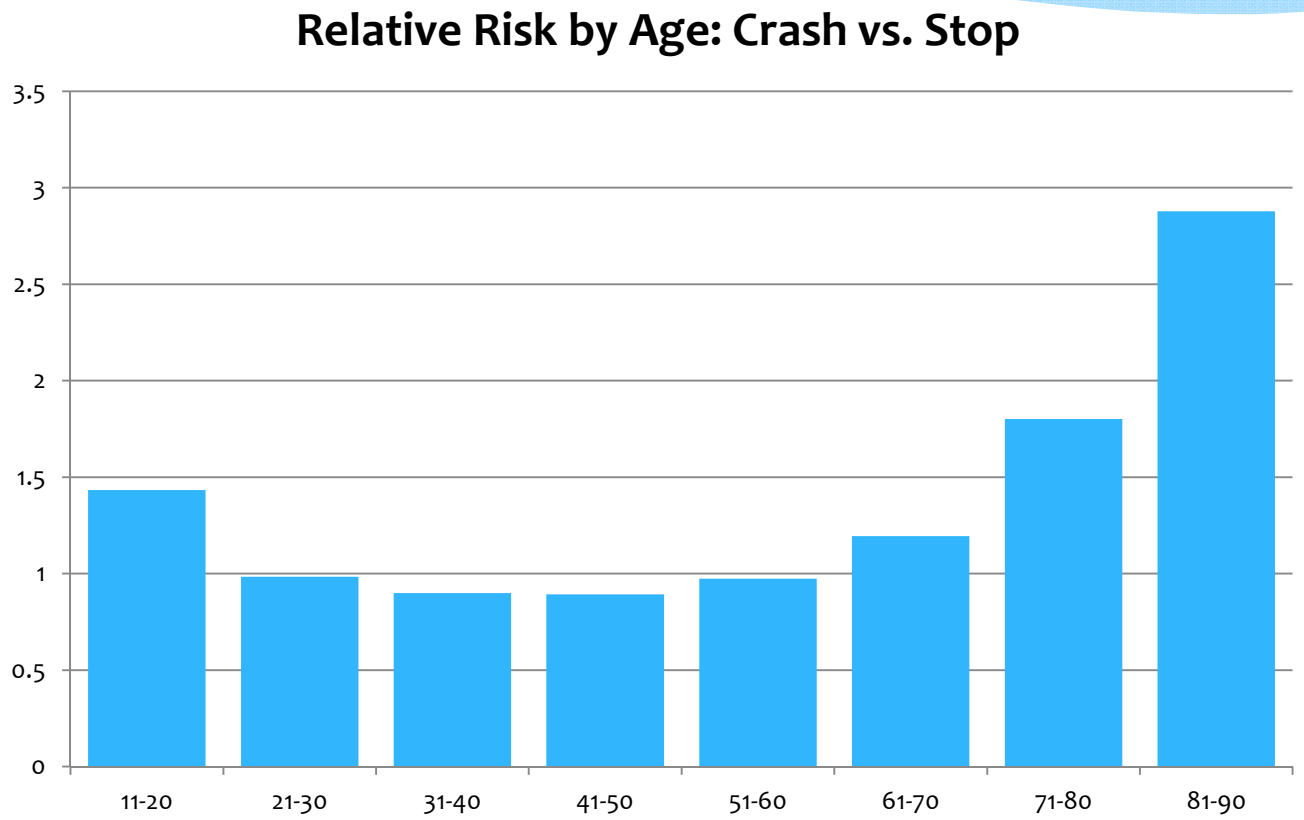


High Tests (>0.20 g/210 L)

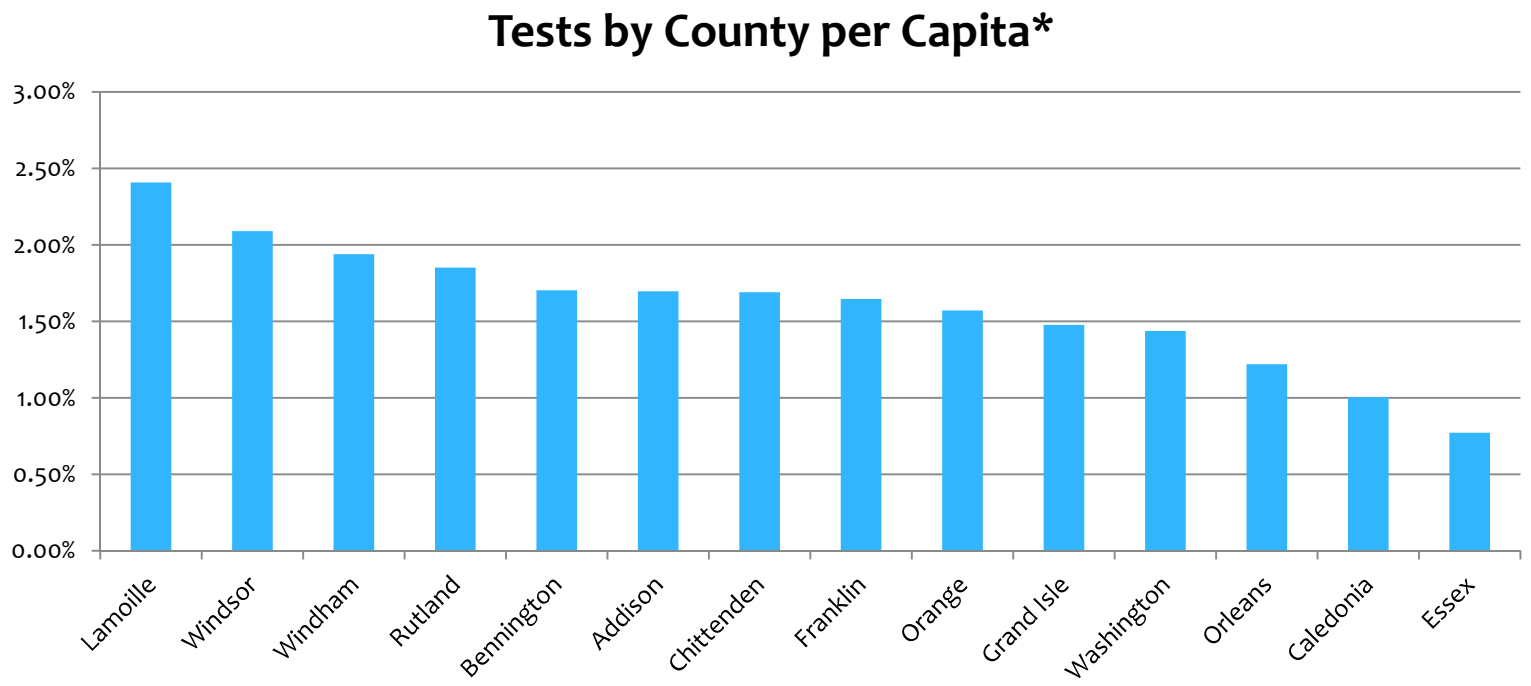
* Age:

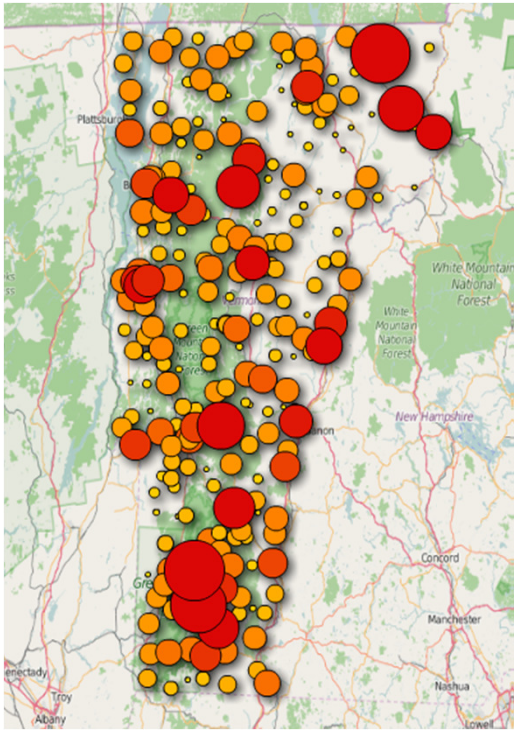


Relative Risk



Geography



*Based on 2012 census population data

Tests per Capita by Town