



Oklahoma Department of Public Safety

3600 N Martin Luther King Ave, Oklahoma City, OK 73111

OKLAHOMA HIGHWAY SAFETY OFFICE

“Create and maintain an environment where Oklahoma roadways are safe for everyone”

Christopher L. Rogers
Traffic Enforcement Planner
Office (405) 425-2827

Vision Statement



OKLAHOMA HIGHWAY SAFETY OFFICE

“To combat the number and severity of traffic crashes by developing and supporting educational, enforcement, and engineering programs”

Christopher L. Rogers
Traffic Enforcement Planner
Office (405) 425-2827

Mission Statement





COLLISION REDUCTION GOALS

Category	2014 (short term)	2015 (intermediate)	2016 (long term)
Fatalities	712	697	678
Fatality rate per 100 M VMT*	1.42	1.40	1.32
Injuries	15,353	14,935	14,518
Injury rate per 100 M VMT*	33.60	31.90	30.20
Unbelted Fatalities	268	254	241
Impaired Driving Fatalities	246	246	246
Commercial Vehicle Collisions	4,371	4,356	4,341

* 100 million vehicle miles travelled

OKLAHOMA DEPARTMENT OF PUBLIC SAFETY TRAFFIC ENFORCEMENT OFFICE

REDUCING FUTURE COLLISIONS THROUGH PREDICTIVE ANALYTICS



Christopher L. Rogers
Traffic Enforcement Planner
Office (405) 425-2827

Collision Reduction Project

IMPETUS



Fatality and Major Injury Collisions are a major concern across our Nation. Causes range from poor human behavior and/or weather related issues while others are attributed to roadway engineering problems. Some are even due to a combination of these elements however many are preventable! **If we can predict how, when, and where these collisions will occur and place focused traffic enforcement in these areas we can effect change and reduce these Collisions in our States?**



SOLUTIONS

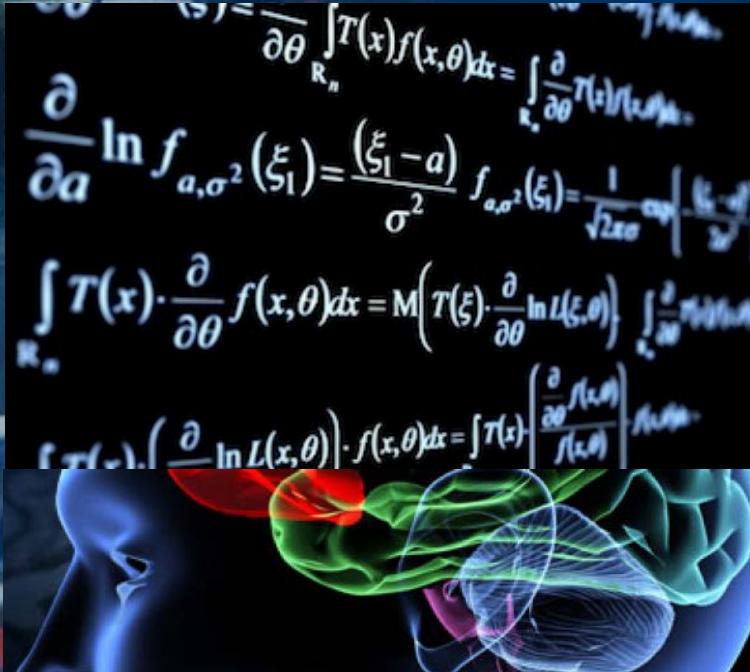
Intelligence-led policing (ILP) is a policing model built around the assessment and management of risk. Intelligence officers serve as guides to operations, rather than operations guiding intelligence.

SOURCE: https://en.wikipedia.org/wiki/Intelligence-led_policing

Predictive analytics is the practice of extracting information from existing data sets in order to determine patterns and predict future outcomes and trends. Predictive analytics does not tell you what will happen in the future.

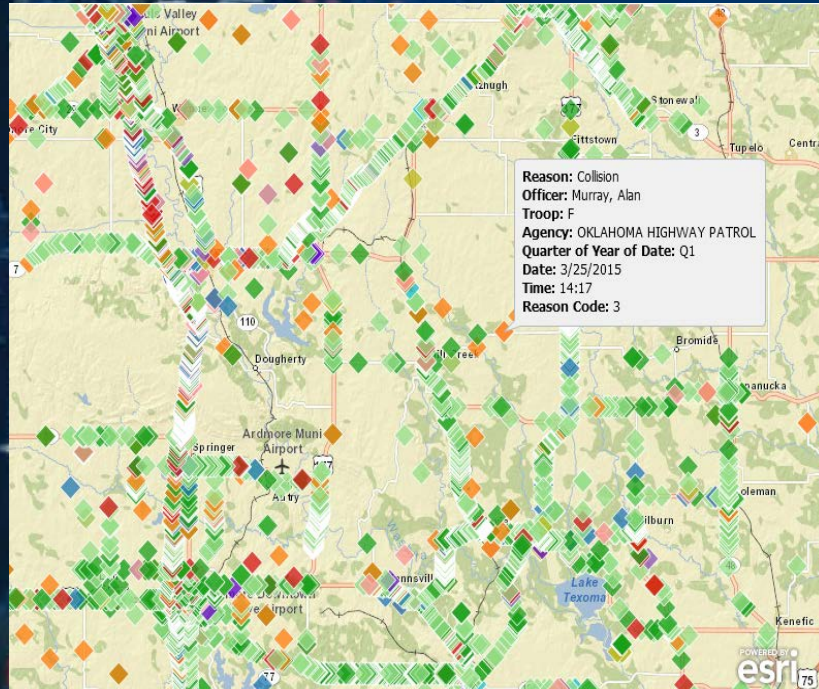
SOURCE: www.webopedia.com/TERM/P/predictive_analytics.html

PREDICTIVE ANALYTICS



Predictive analytics encompasses a variety of statistical techniques from data modeling, machine learning, data mining, and/or the study of human behavior to analyze current and historical facts **to make predictions about future, or otherwise unknown, events.**

PREDICTIVE MODELS



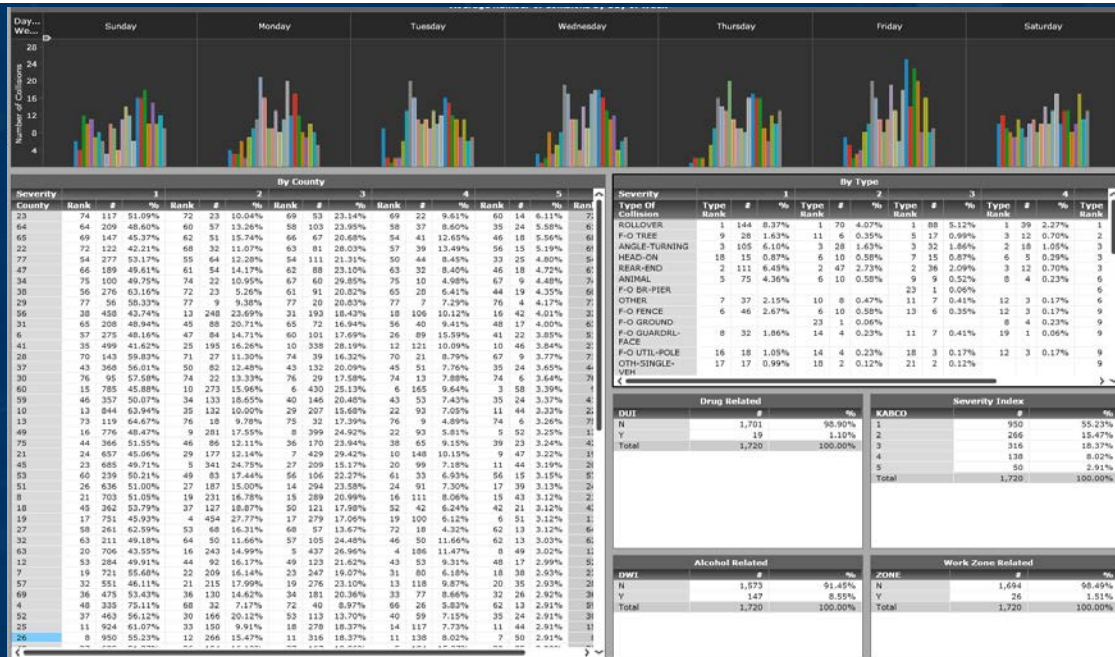
Predictive models exploit patterns found in data to identify risks and opportunities. These models capture relationships among multiple factors allowing the assessment of the risk or potential associated with a particular set of conditions, guiding traffic enforcement planning activities.

BENEFITS OF PREDICTIVE ANALYTICS

The **defining functional effect** of this approach is that predictive analytics **can provide a predictive score (probability)** identifying where future collisions are likely to occur. This information can be used **to effectively determine and influence traffic enforcement planning processes and activities**. This can help **to reduce future collisions and/or the severity of future collisions within high probability areas**.

APPLYING PREDICTIVE ANALYTICS

In some instances, simply enhancing enforcement presence within high traffic areas during peak times may be enough to **reduce future collisions** resulting from negative human behaviors.



IMPACTED BY HUMAN BEHAVIOR

APPLYING PREDICTIVE ANALYTICS



In other areas, it may be determined that there are **inherent roadway engineering issues** that need to be resolved through **collaboration with transportation and/or highway safety offices** in order to reduce future traffic collisions.

IMPACTED BY ENGINEERING ISSUES

PREDICTIVE ANALYTIC PROCESS

1) Gather & Validate Data

- ▣ Paris & Safe-T Data
- ▣ Other Data Sources

2) Map & Model Data

- ▣ Analysis & Mapping Tools
- ▣ Executive Dashboards

3) Analyze Data

- ▣ Find the Patterns
- ▣ Find the Trends

4) Use the Data

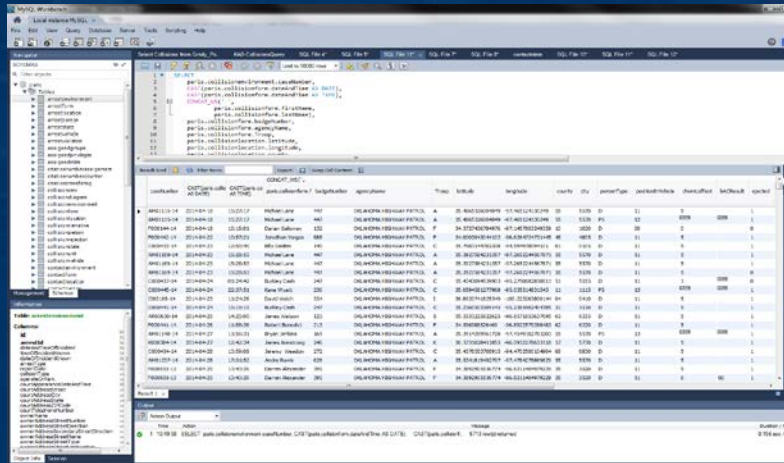

- ▣ Assess Probabilities
- ▣ Assign Resources



GATHERING COLLISION DATA

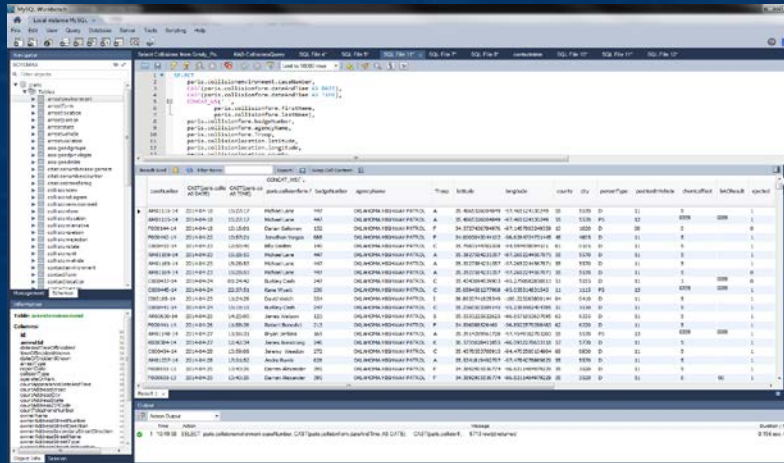

ODOT SAFE-T DATA

OHP PARIS DATA



ODOT SAFE-T DATA

OHP PARIS DATA





Collision Studies

[Go Back to SAFET-I Main Menu](#) [Log Out](#)

QUERY CRITERIA:

Instructions: [\[?\]](#)

ROADWAY REGION SELECT

Query Chart:
 ☒ Entire State
 ☐ Division
 ☐ Truss
 ☐ Metro
 ☐ County

☐ City
☒ Control Section
☒ Ray/High Jct
☐ City Street
☐ County Road

☐ Query over Multiple Roadways or Regions [\[?\]](#)

DATE SELECT

FROM:	<div style="display: flex; justify-content: space-between;"> <div>Year: 2015</div> <div>Month: Jan</div> <div>Day: 01</div> </div>	TO:	<div style="display: flex; justify-content: space-between;"> <div>Year: 2017</div> <div>Month: March</div> <div>Day: 01</div> </div>	* Denotes Partial Year
-------	------------------------------------------------------------------------------------------------------------------------------------	-----	--------------------------------------------------------------------------------------------------------------------------------------	------------------------

REPORT SECTIONS



[Report Printout Quick Links](#) [\[?\]](#)

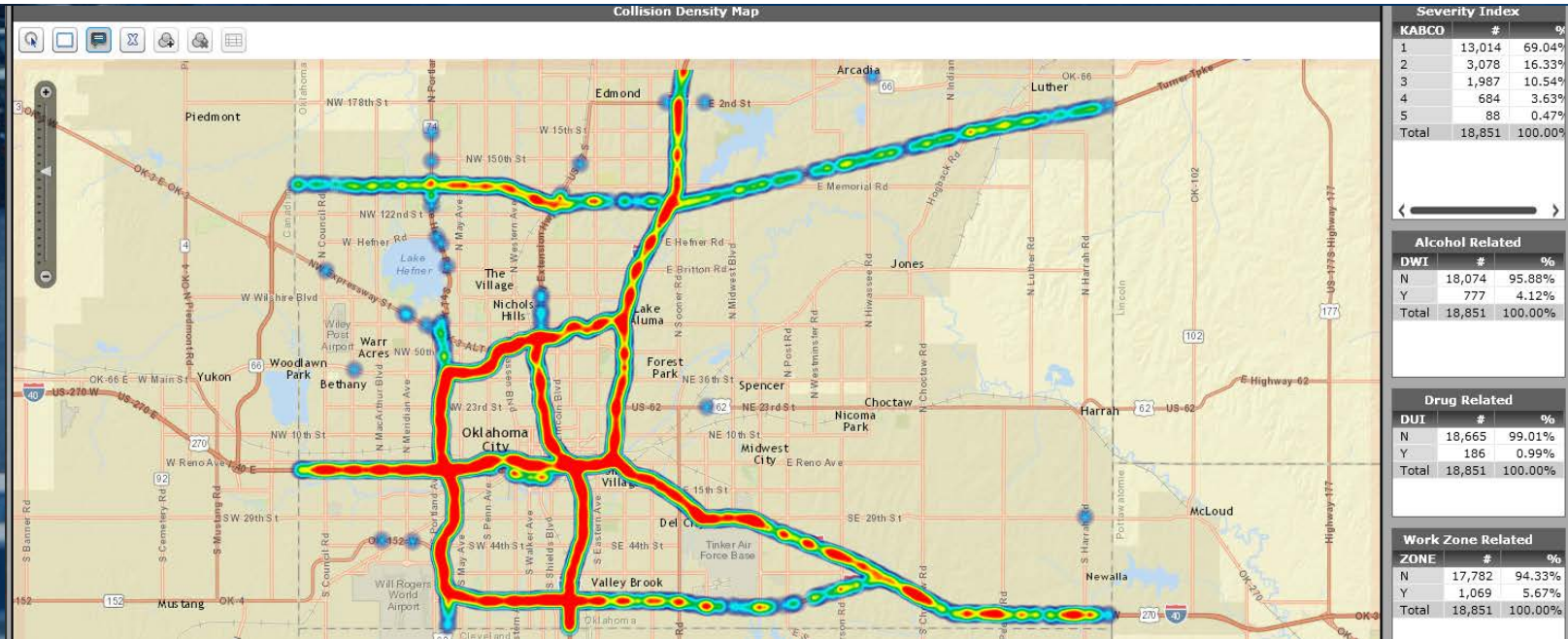
Basic
Collision Analysis
Sliding Scale Analysis
Concentration Listing
All

[Include in Report](#)

☒ Collision Map & Study Totals
☐ Sliding Scale Analysis [\[?\]](#)
(Control Section Data only)

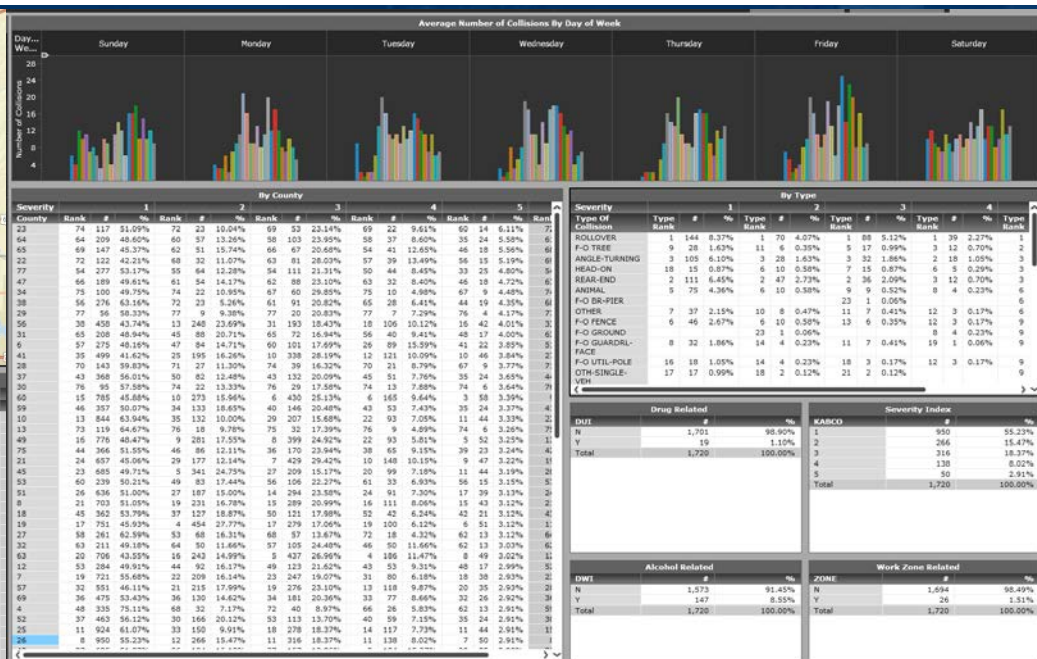
HISTORICAL & CURRENT DATA

MAPPING & MODELING DATA



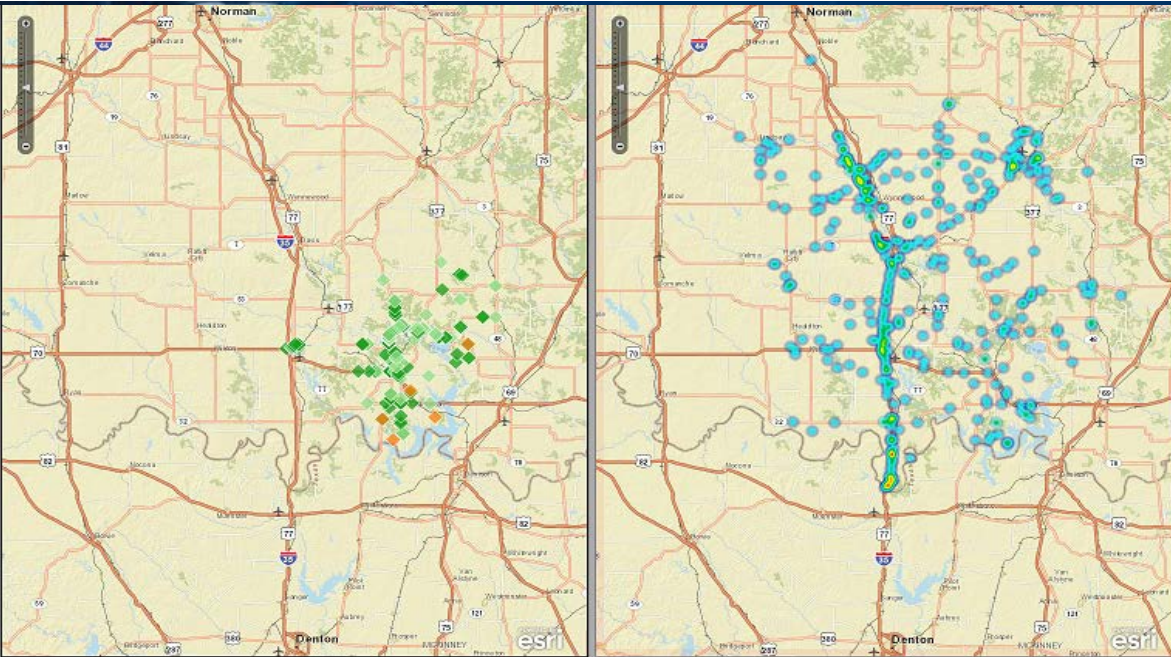
COLLISION DENSITY DATA

ANALYZING DATA



FILTERED VIEWS & TREND ANALYSIS

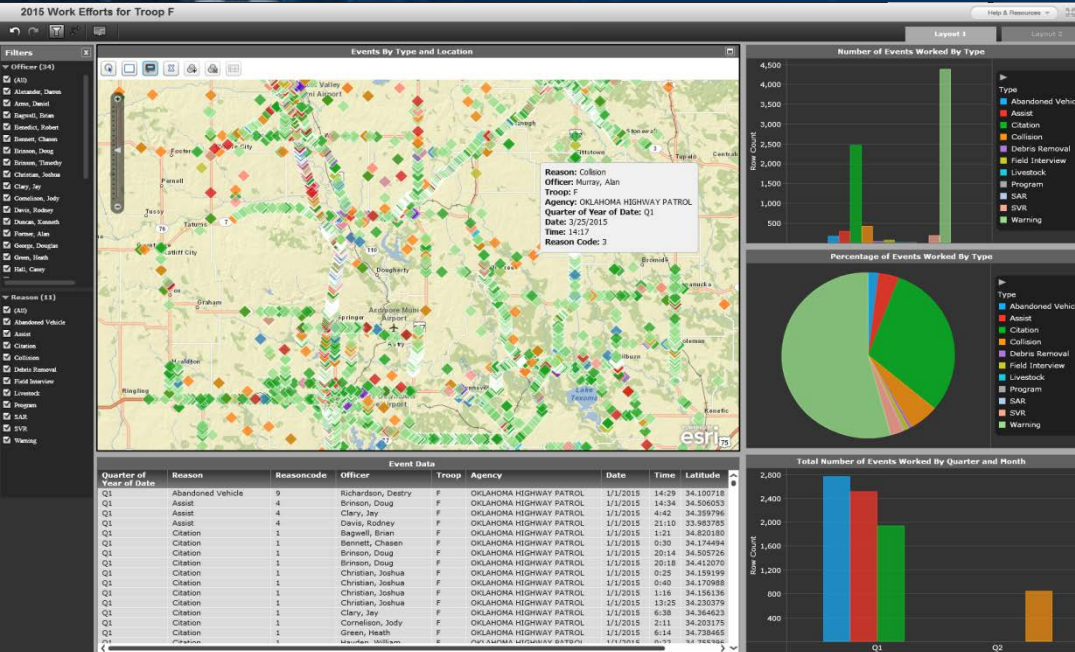
ASSESS PROBABILITIES



Assess where Officers are Patrolling versus where the majority of collisions are occurring. When required reassign patrols to provide enhanced presence and focused traffic enforcement.

AREA PATROLED vs COLLISION DENSITY

ASSESS ENFORCEMENT EFFORTS



Assess what types of contact activities are being performed and adjust enforcement focus on the true cause of collisions versus total number of contacts.

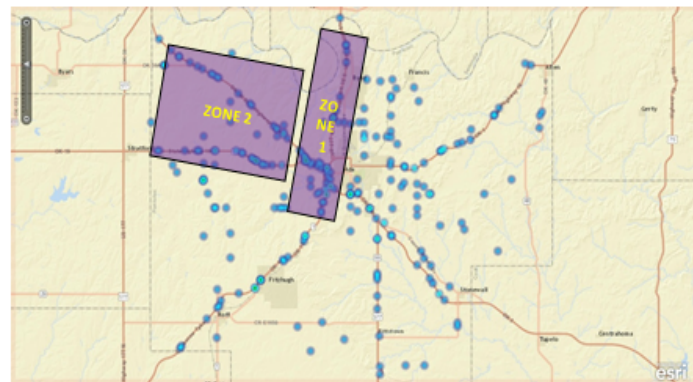
Quality versus Quantity

CITATION vs WARNING vs COLLISION vs...

ANALYSIS REPORTS

Troop Commanders are provided Analysis Reports which identify multiple Zones where KAB Collisions in a County have an unusually high occurrence. From these reports Commanders can then review and assign additional focused patrols in these Zones during specific times and/or days.

KAB COLLISIONS 2010-2014



SUMMARY Between Jan 2010 and Dec 2014, over 285 collisions with a Crash Severity of 3 or higher on the KABCO scale. Of these 32 were Fatal Crashes, 81 were Incapacitating Injury Crashes, and 172 were Non-Incapacitating Injury Crashes.

(K) Fatality	32	11.23%
(A) Incapacitating Injury	81	28.42%
(B) Non-Incapacitating Injury	172	60.35%

According to the ODOT Analyst interpretation of the Officers remarks, the majority of these collisions occurred within one of seven collision types; Angle-Turning Rear-End, Right-Angle, Fixed Objects, Head-On, Pedestrian, and Rollovers.

TYPE OF COLLISION	#	%	K	A	B
ANGLE-TURNING/OTHER	49	17.19%	4	17	28
REAR-END	13	4.56%	1	4	8
RIGHT-ANGLE	26	9.12%	1	7	18
FIXED-OBJECT	63	22.10%	7	14	42
HEAD-ON	15	5.26%	5	3	7
PEDESTRIAN	6	2.10%	2	2	2
ROLLOVER	92	32.28%	11	28	53

According to the data provided by the investigating Officers, of the 285 collisions processed, 24.56% were Alcohol while 4.56% were Drug related. However, results may actually be higher than recorded in instances where final reports were not updated to include post investigation Toxicology results.

Alcohol Related	70	24.56%
Drug Related	13	4.56%

DDACTS... TO BE OR NOT TO BE

- DDACTS in and of itself is not just a simple model or a single strategy
- DDACTS is a philosophy, a process, a guiding set of principles
- DDACTS consists of a multitude of “Approaches” from numerous data sets
- DDACTS incorporates Intelligence-Led Policing and Predicative Analytics
- DDACTS focuses on Crime and Traffic Safety and may require partnerships across jurisdictional boundaries

References

- Eck, J. E., Chelney, S., Cameron, J. G., Leitner, M., & Wilson, R. E. (2005). Mapping crime: Understanding hot spots. Washington, DC: National Institute of Justice.
- National Highway Traffic Safety Administration. (2009). Data-driven approaches to crime and traffic safety (DDACTS): Operational guidelines. Washington, DC: Author.
- National Institute of Justice. (2013). CrimeStat materials. Retrieved April 1, 2014, from <http://www.nij.gov/topics/technology/maps/pages/crimestat-downloads.aspx>

This looks and sounds like DDACTS...???

OKLAHOMA DEPARTMENT OF PUBLIC SAFETY TRAFFIC ENFORCEMENT OFFICE

REDUCING FUTURE COLLISIONS THROUGH PREDICTIVE ANALYTICS



Christopher L. Rogers
Traffic Enforcement Planner
Office (405) 425-2827

Collision Reduction Project