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A Study of Efficiency:
Factors that Influence Efficient Personnel Levels
at a UT System Police Department

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An Administrative Research Paper
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INTRODUCTION

Tasked to evaluate and determine the approximate number of patrol officers needed to man the patrol division at the University of Texas Health Science Center at San Antonio (UTHSCSA) Police Department efficiently, one must inquire as regards the efficiency of the utilization of its current officers as well as research with which to compare such efficiency. Research literature reflects that there are many areas within law enforcement where the effective utilization of police personnel may stray from efficiency. Inefficiency can result from a department's lack of strategy or unequal workload distribution. Worse, a department may not have sufficient resources to fight crime at its source, or have frustrated, even burned out, patrol officers. According to Bristow (1969) the problem of creating a omni-present patrol force in the face of limited numbers of officers, limited budgets while still affording the officer the highest degree of safety is hardest task assigned to the police professional. The solution rests in the efficient use of manpower as this has a direct impact on job satisfaction and criminal activity. When criminal activity is statistically measured and compared to other similar jurisdictions, the result is a basis for efficiency among similar sampled jurisdictions. This is the objective of this research and when completed, proper manning levels and efficient use of manpower will be made evident with the use of six graphs.

Crime factors will be collected on all University of Texas (UT) System campuses then compared to other similar UT Campuses. Data will be plotted onto a graph that will indicate the most efficient number of police officers required at the UTHSCSA Police Department. The resulting data will establish a precise range of police officers with an emphasis on efficiency and acceptable range of expected criminal activity. It is also anticipated that the findings of this research will produce a graph that will indicate efficient manning levels on all remaining UT System Universities. At the conclusion of this research, law enforcement within UT System Universities will benefit from this research by accurately predicting the approximate number of

officers needed to resource a police department efficiently and a reasonably forecast the number of expected Part I and Part 2 crimes.

REVIEW OF LITERATURE

Moore, Trojanowicz, and Kelling (1996) report, the undisputed "core mission of the police is to control crime" (p.3) within its jurisdiction. With this in mind, the task of any police department administrator or division head must focus on the efficient and effective use of its officers. Brandl and Barlow (1996) note that "in the late 1930s Wilsonian theory emphasized the suppression of crime as the primary mission of policing. Fulfillment of this mission depended upon maximizing the efficiency of patrol coverage." But just how do patrol officers begin to control crime. Of course, there is basic commonality in crime. The ingredients for crime call for opportunity, ability, and desire. However, these crime ingredients can hardly be measured with any scientific instrument. One may only expect to reduce the *opportunity* for crime with police presence. Yet it would be difficult to suggest that one could be so well trained as to recognize where crime would or could occur. A better course of action would be if Law Enforcement administrators conducted efficiency analysis' to measure the patrol division work load in order to better meet the specific needs of its community. By this means, the administrator can establish equal patrol beats among the patrol officers for the purpose of *effective distribution*.

Mathematical or scientific distribution of patrol officers has been studied since the 1930s. The criterion used to measure effective distribution of patrol officers have varied greatly. Presently, there are many systems for calculating effective distribution of patrol officers. Among the effective distribution systems, is the weighted system. This system is based on Part I, Part II, and other crimes, where more serious offenses are weighted more heavily in determining manning strength (Bristow, 1969). However, can Part I and II crimes, (i.e. rape, domestic violence, forgery and embezzlement) be reduced through preventative patrol if the criminal's desire is only moved to another location? Maybe what is important is not the seriousness of the

offense or even a weighted system but the re-appearance of certain crimes within a jurisdiction. It is the assumption of this researcher that the reoccurrence of crime may be the best indicator of insufficient number or inefficient use of police manpower. This leads to another system based on the amount of time consumed by an incident. The Consumed Time System is based on the type of calls and frequency that remove a patrol officer from his primary duty (Bristow, 1969). However, without constant in-depth analysis, such a system could eventually assign an officer inside a shopping mall waiting for a shoplift or a fraudulent use of credit card. Such human resource is most likely to be wasted on this type of strategic patrol. The fact remains that this type of patrol most likely has little to no suppressive effect over these and certain other crimes and only displaces the crime to a different location (Marvell & Moody, 1996). Other effective manpower distribution systems include measuring Street Mileage, Area and Response Time, and Day of the Week Deployment (Bristow, 1969) to each there are pros and cons that may or may not fit the particular needs of a department.

Further complicating this issue, in July 1972, the most comprehensive experiment ever conducted to analyze the effectiveness of routine preventative patrol took place in Kansas City, known as the Kansas City Preventive Patrol Experiment (Cordner, Gaines, & Kappeler, 1996). The experiment ended with some very controversial results. Cordner, Gaines, and Kappeler (1999) explain that scientific study indicated that any change in the number of uniform officers or police presence had no real effect on the occurrence of crime. However, Cordner, Gaines, and Kappeler (1999) go on to say that the community seems to believe that police presence along short response times to calls has a major impact on the occurrence of crime. It is apparent that the Kansas City Preventative Patrol Experiment set a new scientific precedent which indicated a public acceptance of an omni-present patrol force and a quick response times are the keys to controlling crime even if such belief is not substantiated with scientific support. With such a variety of effective distribution systems to utilize and with the available scientific data, this

researcher began a new search for more fundamental elements for calculating effective distribution of patrol officers.

One must consider a very large and dramatic increase in police officers might effect and reduce the occurrence of crime. Cordner and Sheehan (1999) state that experiments varying the strength of foot patrol did affect the occurrence of crime. In an area where no police presence was found but where one officer was assigned to foot patrol, this resulted in a decrease in crime. However, when there was an increase to two officers, this had no effect on the occurrence of crime. Yet when an additional increase was made, greater the two officers, once again a decrease in the occurrence of crime was measured. A different study in a New York precinct, conducted in 1966 determined that an increase of approximately 40 percent dramatically reduced the occurrence of street crime by 30 to 50 percent (Cordner & Sheehan, 1999). Aside from this dramatic increase, any minimal increase in patrol is not expected to speed reporting of crimes by the community nor improve the quality of leads found at a crime scene. Cordner and Sheehan (1999) clarify, "…perhaps, most important, the level of saturation seems less significant than the tactics that are employed…" (p. 395).

An obvious step in effective utilization of patrol personnel then is to define the police departments' organizational strategies. Because police departments will never have enough financial resources to hire and supply all the officers needed to stop crime in their community, the question then becomes how best does the police department use its officers to support the departments' crime strategy. A police department may claim to utilize all the below strategies however most police departments could not afford to practice all the listed strategies. According to Cordner and Sheehan (1999), these are the most contemporary police departmental strategies (p. 446):

- Professional crime fighting approach – Traditional crime control of usual street crime
- Strategic crime fighting approach – Same as above but with emphasis on specialized crime
- Problem solving approach – Separates from incident based policing toward prevention
- Community Policing Approach - Empowers the citizen and joins their crime efforts

Any of the above, self-defined or other clear define strategies are good starting points. However, all strategies should have some similarities. For example, departmental strategies that incorporate change with new policing concepts which keep the rank in file informed and allow input from the community will be successful. It must be said that strategies should consider those minor violations and community concerns that, if gone unchecked, lead the community to believe there to be a breakdown in the fabric of the community. Such non-law breaking incidents begin the deterioration of confidence the community has in the ability of the police to handle community concerns.

With the departmental strategy better defined, there is a need to implement the strategy. This is crucial in the effective utilization of patrol officers and the ultimate goal of this researcher. Effective utilization will occur when police administration regularly meets with its departmental heads for the purpose to re-emphasize departmental strategy thorough the use of goals and feedback. It is also important to keep a representative of the lower ranks in all such meetings as it offers so much more to the camaraderie and involvement in the patrol ranks. The Patrol Division Commander must relay the strategies accurately to the Shift Sergeants. Once done, the Shift Sergeant assumes the responsibility to maintain the camaraderie while departmental strategies are pursued. Shift Sergeants should then offer and accept feedback with and from the Division Commander to ensure departmental strategies are being fulfilled. In regards to departmental strategy, the community demands from its police to restore order after the crime has been committed. Then the bottom line in police management and public opinion is, how efficiently and effectively are the police *reacting* to crime occurring in the community? This

can only be managed by deliberate departmental strategy, control of crime within the jurisdiction and maximizing efficient use its patrol officers.

METHODOLOGY

Until now this research paper has very briefly examined a few of the background issues of effective utilization of police officers. The focus will now shift on a particular environment and community, the University of Texas campuses. The deliberate use of local city crime data was used to analyze and compare the occurrence of crime on UT System campuses. Following this comparison, data was compared with the occurrence of crime on similar campuses with regard to campus populations and numbers of uniformed officers. The purpose of this was to identify from these sampled campuses which campuses were suppressing the occurrence of crime most effectively. The intent is to average the most efficient campuses and create a graph that will project efficient use of manpower. Ultimately, a graph will be created that will determine the approximate number of patrol officers needed to resource the patrol division at the UTHSCSA Police Department. It is also believed that the graph will project the most efficient number of police officers required at any size UT System campus.

Deep reflection was needed in considering which of the major crime factors were to be considered as the major crime contributors on the UT Campuses. Adams (2001) has listed 20 factors that determine patrol deployment. Yet, authors Iannone and Iannone (2001) provides another list with unique patrol deployment factors. Apparently, depending to whom one speaks, and what one reads, one may find a separate and unique list of crime factors by which proper distribution of patrol officers should be determined. It might be that different law enforcement departments and jurisdictions have generally similar as well as specifically unique crime factors that appear in their jurisdictions. This also lends itself to the need to accurately define important crime factors for all jurisdictions through statistical survey and efficiency analysis. The

following list provides an incomplete list of crime factors that better fit the UT System jurisdictions and would influence patrol deployment:

Part I Crimes	Population Density	Location / Number Auto Thefts
Part II Crimes	Location of Crimes and Arrests	Resident and Transient Factors
Number of Calls for Service	Property Loss from Crime	Location of frequent Incidents
Time Spent of Service Calls	Number of Public Gathering Areas	Socio-economic factors

This study further limited this list of crime factors to: the occurrence of Part I and Part II Crimes on the sampled campuses, the occurrence of occurrence of Part 1 Crimes in the local city, population density of the campus, population density of the local city and time spent on service calls.

In utilizing manning strengths and unique crime statistics from these UT System Police Departments, this researcher assumed the majority of the UT System Chief Administrators had already given a great deal of consideration to local crime factors. Thus, the use of UCR crime data collected from these UT Campuses and the subsequent creation of the graphs in this research will offer keen insight to UT System communities.

FINDINGS

This following crime data was taken from the UT System Police 2001 Annual Report, Baldridge, (2001). Tables 1 and 2 show the rate of crime is not equally distributed by population at the Health Science Center Campuses. Table 1 shows the 2001 UCR crimes occurring on the UT System Health Science Centers and (Table 1).

Table 1. UT System Crime Statistics at Health Centers, Part I and II Crimes per Police Officer.

2001 Health Science Center Schools	Population	Uniform Officers	Population Per Officer	**Pt I Crimes On Campus**	**Pt II Crimes On Campus**	Crimes per Uniform	Total All Crimes
UTMB Galveston	16053	85	188.9	344	132	5.6	476
UTMD Anderson	11932	157	76	240	50	1.8	290
UTHSC San Antonio	9431	58	162.6	57	32	1.5	89
UTHSC Houston	8810	63	139.8	115	22	2.2	137
UTSWMC Dallas	8171	92	88.8	283	156	4.8	439
UTHC Tyler	1422	16	88.9	22	14	2.3	36

Table 2 shows the 2001 UCR crimes occurring on the UT System Non-Health Science Centers. (Table 2).

Table 2-UT System Crime Statistics at Non-Health Centers, Part I and Part II Crimes per Police Officer.

2001 Non Health Science Center School	Population	Uniform Officers	Population Per Officer	**Pt I Crimes On Campus**	**Pt II Crimes On Campus**	Crimes Per Uniform	Total All Crimes
UT Austin	75293	153	492.1	761	710	9.6	1471
UT Arlington	26849	43	624.4	338	341	15.8	679
UT San Antonio	24159	61	396.0	178	166	5.6	344
UT El Paso	21078	49	430.2	223	172	8.1	395
UT Pan Am	17008	23	739.5	117	84	8.7	201
UT Dallas	15582	39	399.5	136	128	6.8	264
UT Brownsville	12656	19	666.1	68	90	8.3	165
UT Tyler	4666	8	583.3	25	40	8.1	65
UT Permian Basin	3020	13	232.3	10	50	4.6	60

In Table 1, UTSWMC Dallas experiences the second highest amount of Part I crime per officer while having one of the two lowest campus population per police officer. UTHSC San Antonio has one the two highest campus populations per uniformed officer yet experiences the lowest crimes per uniform ratios. Uniform officers include both the number of guards and police officers. At the non-Health Science Centers, Figure 2, UT San Antonio appears to break the expected statistical trend. The school has one the three highest campus populations but maintains one of the two lowest UCR crimes per uniform. UT Arlington and UT Brownsville have almost the same number of uniformed offers per population but UT Arlington maintains a twice the level of UCR crimes per officer than UT Brownville. These particular police departments were

statistically compared to each other because these campuses have similar communities, having officers that graduated from the same academies, and the same law enforcement goals and organizational strategies. Further, it is the belief of this researcher that this crime data offer evidence in regards the efficient use of uniformed officers.

Table 3 and Table 4 address the influence of the crime from local city onto the respective campuses. Table 3 shows the 2001 UCR crimes occurring in local cities at each of the UT System Health Science Centers and Figure 4 show the 2001 UCR crimes occurring in local cities at each of the UT System Non-Health Science Centers.

Table 3 – Comparative UT System Health Science Centers with Local City Crime.

Health Science Center Schools	Campus Population	City	City Population	City Pt I Crimes	Campus Crimes per 1000	Part 1 City Crimes per 1000
UTMB Galveston	16053	Galveston	60339	5306	29.7	87.9
UTMD Anderson	11932	Houston	1920350	133353	24.3	69.4
UTHSC San Antonio	9431	San Antonio	1193440	86986	9.4	72.9
UTSWMC Dallas	8171	Dallas	1119580	106430	53.7	95.1
UTHSC Houston	8810	Houston	1920350	133353	15.6	69.4
UTHC Tyler	1422	Tyler	87173	6287	25.3	72.0

Table 4 - Comparative UT System Non Health Centers Crimes with Local City Crime .

Non Health Science Center Schools	Campus Population	City	City Population	City Pt I Crimes	Campus Crimes per 1000	Part 1 City Crimes per 1000
UT Austin	75293	Austin	611561	38816	19.5	63.5
UT Arlington	26849	Arlington	324533	21535	25.3	66.4
UT San Antonio	24159	San Antonio	1193440	86986	14.2	72.9
UT El Paso	21078	El Paso	637462	34932	18.7	54.8
UT Pan Am	17008	Edinburgh	47286	4724	11.8	99.9
UT Dallas	15582	Dallas	1119580	106430	16.9	95.1
UT Brownsville	12656	Brownsville	153653	11429	12.5	74.4
UT Tyler	4666	Tyler	87173	6278	13.9	72.0
UT Permian Basin	3020	Odessa	92891	4848	19.9	52.2

These universities are compared by dividing both local city and campus Part I crimes over the populations (per 1000). This indicates how influential local city crime may affect the occurrence of crime on university campuses. In Table 3, indicates the UTHSC in San Antonio rests in one of the three highest city populations but has the lowest crimes per 1000 persons rate, at 9.4 crimes per 1000 persons when compared to similar campuses. In Table 3, the City of Houston

has one of the two lowest crimes per 1000 persons in the sampled cities yet UTMD Anderson has the fourth highest campus crimes ratios (24.3 crimes per 1000 persons). In Table 1, we also find UTMD Anderson also has the highest number of officers per population ratios among the Health Science Center Schools at one officer for every 76 persons. In Table 4, the City of Brownsville experiences one of the three highest levels of UCR Part 1 crimes but UT Brownsville experiences fewer UCR Crimes than UT Arlington. Also in Table 4, the City of San Antonio experiences a much higher Part I City Crimes than the cities of Arlington, Odessa and Austin yet UT San Antonio has a much lower UCR Part I crime rate. When one considers these comparisons are made with only similar campus communities with similarly police officers and guards with similar organizational goals and objectives, one is forced to consider if the effective use and better utilization of officers would have a larger impact on the occurrence of crimes.

Once again, it is the belief of this researcher that these statistics do in fact give evidence of the efficiency, utilization of manpower and proper manning levels when comparing similar communities experiencing similar crimes. Many will argue that many city crime factors were not considered or that on campus dormitories were not sufficiently considered in this research but one must also consider that only similar UT System universities were used in the above comparisons. The following averages should be used for additional reflection:

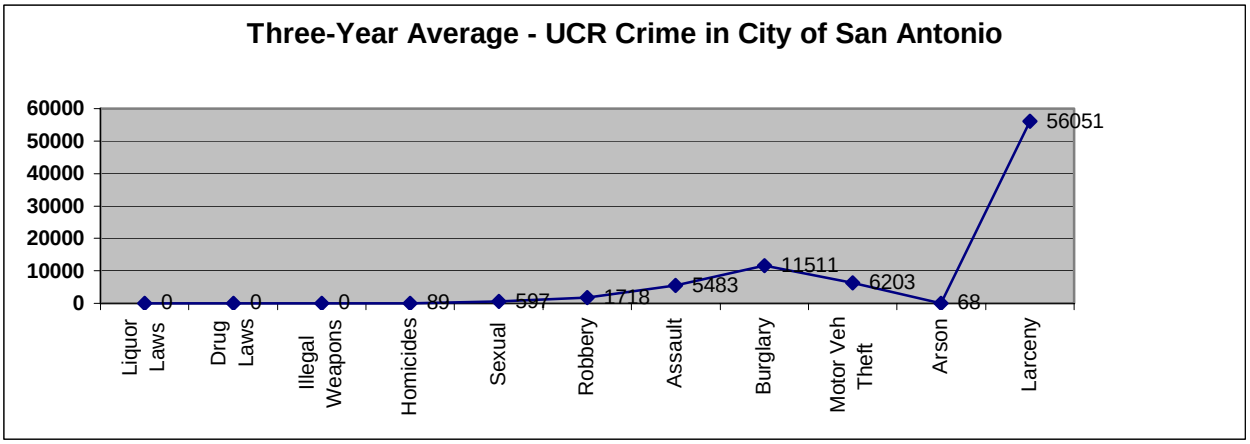
The national average crime per 1000 persons is approx.	36.10
The cities near Health Centers Part 1 crimes average per 1000 is approx	77.78
The cities near non-Health Centers Part 1crime average per 1000 is approx	72.36
UT Health Science Center average crime per 1000 is approx.	26.30
The non-UT Health Science Center average crime per 1000 is approx.	17.00

When you consider the average of Part I crimes per person on Health Science Center campuses is approximately 26.30 crimes per 1000 persons, any Health Science Center campus above the average must consider a self-analysis. Organizational objectives may need re-definition or re-emphasis to meet these goals certainly obtain by other similar campuses. An efficiency analysis

may need to be accomplished in an effort to make adjustments to patrol beats to produce more efficient crime levels and lower the occurrence of crime. By redefining organizational objectives and focusing on strategic proactive efforts, a responsible effort must be made to reduce campus crime in an effort to meet the expected campus averages. This would also be true for meeting the expected average and norms set by non-Health Science Center campuses. Not doing so is not effectively deploying or utilizing the patrol force effectively. One must consider the remaining jurisdictions having similar goals and similarly trained police force who have obtained given averages.

Tasked to evaluate and determine the approximate number of patrol officers needed to man the patrol division at the UTHSCSA Police Department efficiently, this researcher began to focus on possible influence of the crimes surrounding and adjacent property to the UTHSCSA campus. Figure 1 provides insight into the expected types and number of local crimes occurring in the City of San Antonio (Figure 1).

Figure 1. Three-Year Average of UCR Crime in the City of San Antonio.



Available data provided by the San Antonio Police Department website made it possible to further concentrate on the local area immediately adjacent to the University of Texas Health Science Center. Figure 2 provides UCR crimes occurring immediately in the vicinity of the

university. UCR Crime data on Liquor Law, Drug Law and Illegal Weapons Violations were not available on the San Antonio Police UCR Crime statistics website (Figure 2).

Figure 2. Three-Year Average of UCR Crime in the Adjacent Area of the UTHSCSA.

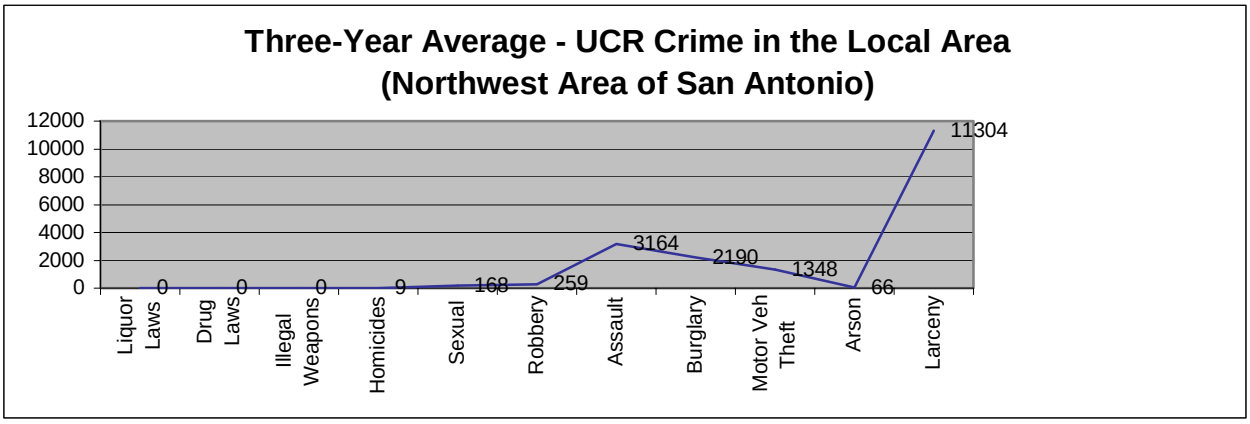


Figure 3 provided the needed comparison graph for similar UCR reported crimes on the University of Texas Health Science Center campus (Figure 3).

Figure 3. Three-Year Average of UCR Crime on the UTHSCSA Campus.

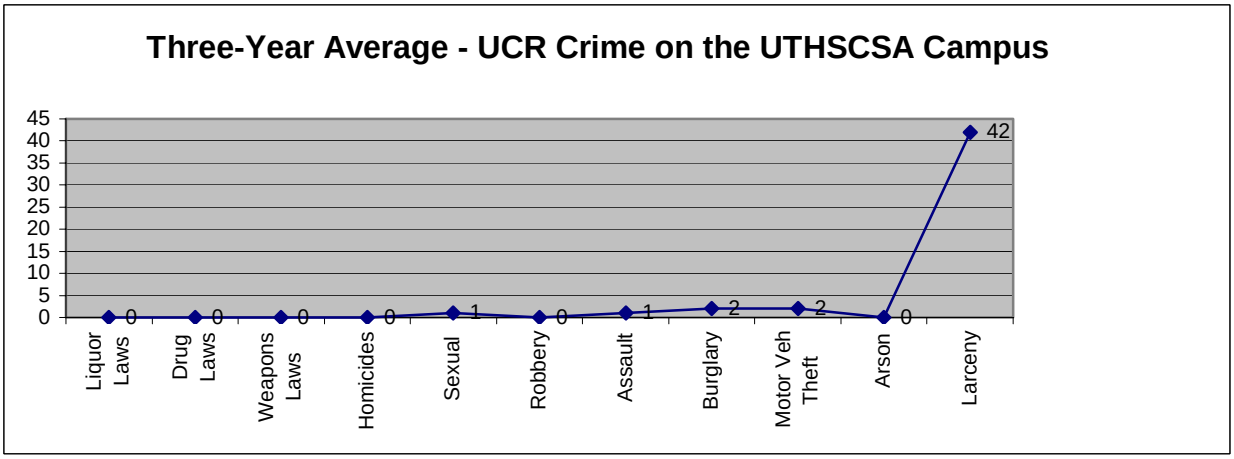


Figure 3 indicates very similar UCR crimes occurring on UTHSCSA Campus with UCR crimes occurring in the local city of San Antonio.

Is the UTHSCSA Police Department effectively utilizing its patrol force? The crime data here explores the averages and norms and the data indicates that the UTHSCSA has effectively reduced the occurrence of UCR reportable crimes, in all UCR offense categories. When

comparing the occurrence of crime with similar UT System campus one may conclude from the data that the UTHSCSA campus has effectively reduced the occurrence of UCR reportable crimes on campus, in all UCR offense categories in respected to similar crime occurring on similar campuses. The question of whether there are a sufficient number of officers present at the UTHSCSA Police Department to effectively reduce crime can now be answered. Yes, there are sufficient officers present in year 2001 at the UTHSCSA Police department and have efficiently managed the criminal element to keep the UCR reportable crime at or below an expected range.

This research has examined critical data toward establishing averages and norms. The results have assisted in determining effective utilization of patrol division officers at UTHSCSA Police Department. The patrol officers have successfully reduced the campus crime when compared to similar communities and when compared to local city crime. Further, the UTHSC San Antonio campus fulfills its law enforcement objectives while keeping the expected number of police officers in its department. The average number of uniformed officers at the UT System Health Science Centers in 2001 was approximately one uniformed officer for 162.6 persons on campus. This number represents both uniformed guards and the police officers. The average number of police officers at the UT System Health Science Centers in 2001 was approximately one officer for 349.3 persons on campus.

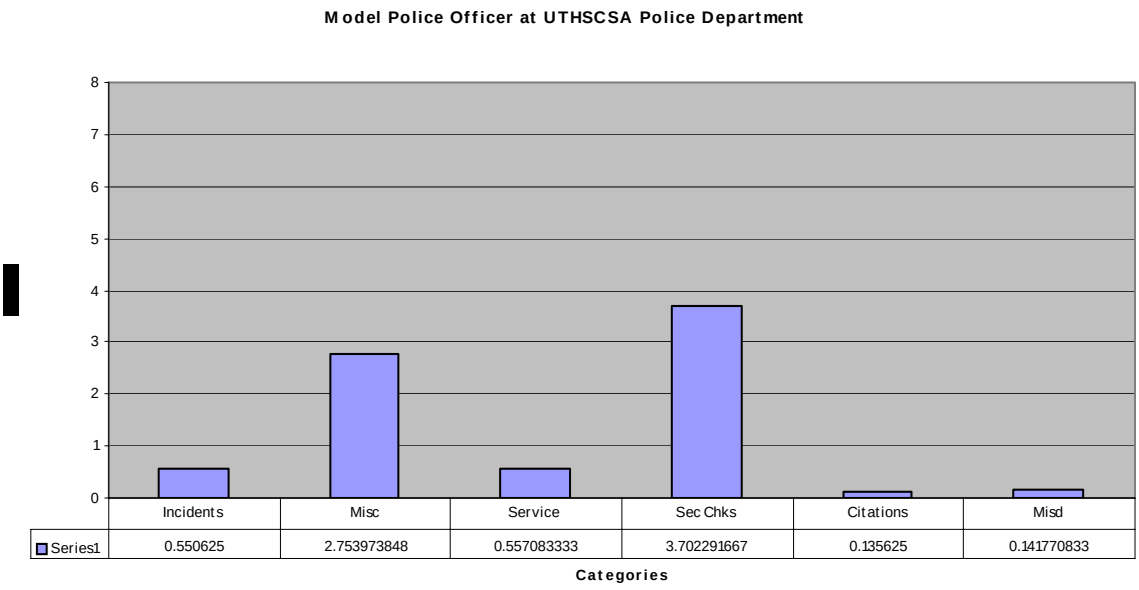
An examination of the distributed workload the average uniform officer was also explored. All police departments must naturally balance its role as a law enforcement agency with its community service role. Traffic Control, Security Presence, Funds Escort, Parking Enforcement, Assist Motorist Programs, Crime Prevention Surveys, Locking and Unlocking doors, Alarm checks and Special Event parking and security are just some of these community service duties expected from the UTHSCSA Police Department. At this specific department, these community services assist in balancing a delicate police officer presence, police availability and accessibility to community requests.

Once again, this researcher used statistical data to determine norms and averages by using all dispatched calls for one entire month to examine how much time a UTHSC San Antonio Police officer spends his/her day. This was accomplished by using the dispatched calls for nine UTHSC San Antonio Police Officers for one month. All calls these officers were dispatched to were categorized in one of the following topics:

- Security Checks
- Miscellaneous Calls
- Service Calls
- Calls for Incidents
- Calls for Misdemeanors and or Felonies

The UTHSCSA Computer Aided Dispatch (CAD) System allowed for the amount of times the officer spent on calls. These times were totaled, averaged, then placed in one of the above five topics. The computed results gave an average working day of a model police officer at the UTHSCSA Police Department. Figure 4 indicates the approximate time the model police officers spend on calls (Figure 4).

Figure 4. Manpower Usage Graph.



The list below indicates how the 8 hour day is spent for the model police officer at the UTHSCSA Police Department:

1. Security Checks	Approx 3 hours and 45 minutes
2. Miscellaneous Calls	Approx 2 hours and 50 minutes
3. Service Calls	Approx 30 minutes
4. Calls for Incidents	Approx 30 minutes
5. Calls for Misdemeanors	Approx 10 minutes
6. Traffic Citations	Less than 10 minutes
Total	**Approx. 8 Hour Shift**

These data and figures illustrate that the police officers at the UTHSCSA Police Department, on the average, spends nearly 4 hours of each day walking in the building conducting security checks, nearly 3 hours of the work day on miscellaneous calls. The officer spends approx 30 minutes on service calls, 30 minutes on incident reports an average of 10 minutes on misdemeanor calls for the month and 10 minutes per shift on citations on the average per month. These statistics indicate the UTHSCSA Police Department as a department who has dedicated a majority of its law enforcement resources and police manpower to foot patrols within buildings and in close proximity to its community.

Currently, many police departments have implemented community policing concepts and request the patrol officers to act as community counselor. This may come easier for certain police officers. However, there will be other officers who may have come to expect assignments that ended with handcuffs and/or lethal force. The department strategy and the role of the patrol officer should be made clear to each patrol officer and it should be very clear to police administration and management as well. The patrol officer must be made to understand that his uniform does not allow him to be a counselor but a problem solver with police authority. It is his authority as a police officer that allows him to be a seemingly effective community “counselor” and ultimately the police presence that restores public order. With this understanding, a patrol officer becomes an effective police departmental representative and an effective, proactive tool against the threat of crime and civil rights violations. The primary tool and most effective

weapon a police officer has his ability to communicate. The practical skills the officer uses in the use of his weapon and handcuffs come after the ability to communicate has failed, or when the public or his own safety is threatened.

This research paper has explored a variety of theories, statistical data, criminal influences, and has remained focused on similar jurisdictions. A deliberate use of local city crime statistics and campus statistical data were used in the creation of the following six graphs. The intent is to select from similar campuses the most efficient campuses. These six graphs will establish a precise range of police officers with an emphasis on efficiency and an acceptable range of expected criminal activity. Equally important to note, these estimated projections will have been derived from campus crime statistics (year 2001) subject to relevant types of crimes, the amount of crimes, socioeconomic and other crime factors of UT System campuses during 2001. The data used from these unique communities have similar populations and organizational objectives with similarly trained officers and types of communities. Once again, it is assumed the majority of the UT System Police Departments has been managed by Chief Administrators with a great deal of consideration to local crime factors and is grown out of specific community concerns.

Figure 5 shows the relationship of crimes occurring on campus per uniformed officer with the population on campus per uniformed officer at each of the Health Science Center (HSC) campuses. Figure 6 does this same comparison for Non-Health Science Centers. Each of the represented schools is designated by two numbers. The crimes-to-uniformed officer ratio (C t Of) is provided next to the schools name. This (C t Of) number is produced by taking the total number of Part I and Part II crimes and dividing it by the number of patrol officers on that campus. The population-to-uniformed officer ratio (P t Of) is also provided. This (P t Of) number is produced by taking the total number of persons on campus and dividing it by the number of patrol officers on the campus. The resulting numbers representing the school is then

plotted indicating the relationship with the remaining HCS campuses in respect to its ability to suppress crime on campus with its assigned officers. The tri-colored block in the upper right of Figure 5 is color-coded indicating a less desirable (red), average (blue) and desirable (green) locations on the plotted graph. The graph also shows a projection lines. The area of the red line establishes an undesirable area and represents an average of those schools plotted above the blue average line. As one moves down the graph away from the red line, one approaches the blue line (the average projection line) and represents an average of all schools sampled. The green projection line severs a desirable area on graph and represents those schools plotted below the blue average line. The horizontal dotted line provides the average of HSC Campuses crimes per uniformed officer. Above the dotted line indicates a higher crime rate and below the dotted line is a below average crime rate. The vertical dotted line provides the average population per police officer on HSC Campuses. Left of the dotted line indicates a lower population than the average and to the right, a higher population than the average among HSC campuses.

Figure 5 indicates the UTHSC in San Antonio (a green 6 icon) has one of the two highest populations to police officer ratios but has the lowest crimes per officer ratios when comparing UTHSC campus. This is an excellent position on the graph. This graph indicates that UT Southwest Medical Center Dallas (a red 2 icon) has one of the three lowest populations to police officer ratios but has the one of the two highest crimes per officer ratios when comparing UTHSC campuses. This is the least desirable position on the graph.

Figure 5. Relationship of Crimes and Population with the Number of Officers At UT System Health Science Centers

	UT System HSC Campuses	Ct Of	Pt Of
2	UTSWMC Dallas	4.80	88.80
3	UTMB Galveston	5.60	188.90
1	UTMD Anderson	1.80	76.00
5	UTHSC Tyler	2.30	88.90
4	UTHSC Houston	2.20	139.80
6	UTHSC San Antonio	1.50	162.60
	UT System High Avg	4.23	122.20
	UT System Avg	3.03	124.17
	UT System Low Avg	1.83	126.13

High Crimes Per Officer Low Population per Officer	High Crimes per Officer High Population per Officer
Low Crimes per Officer Low Population Per Officer	Low Crimes per Officer High Population per Officer

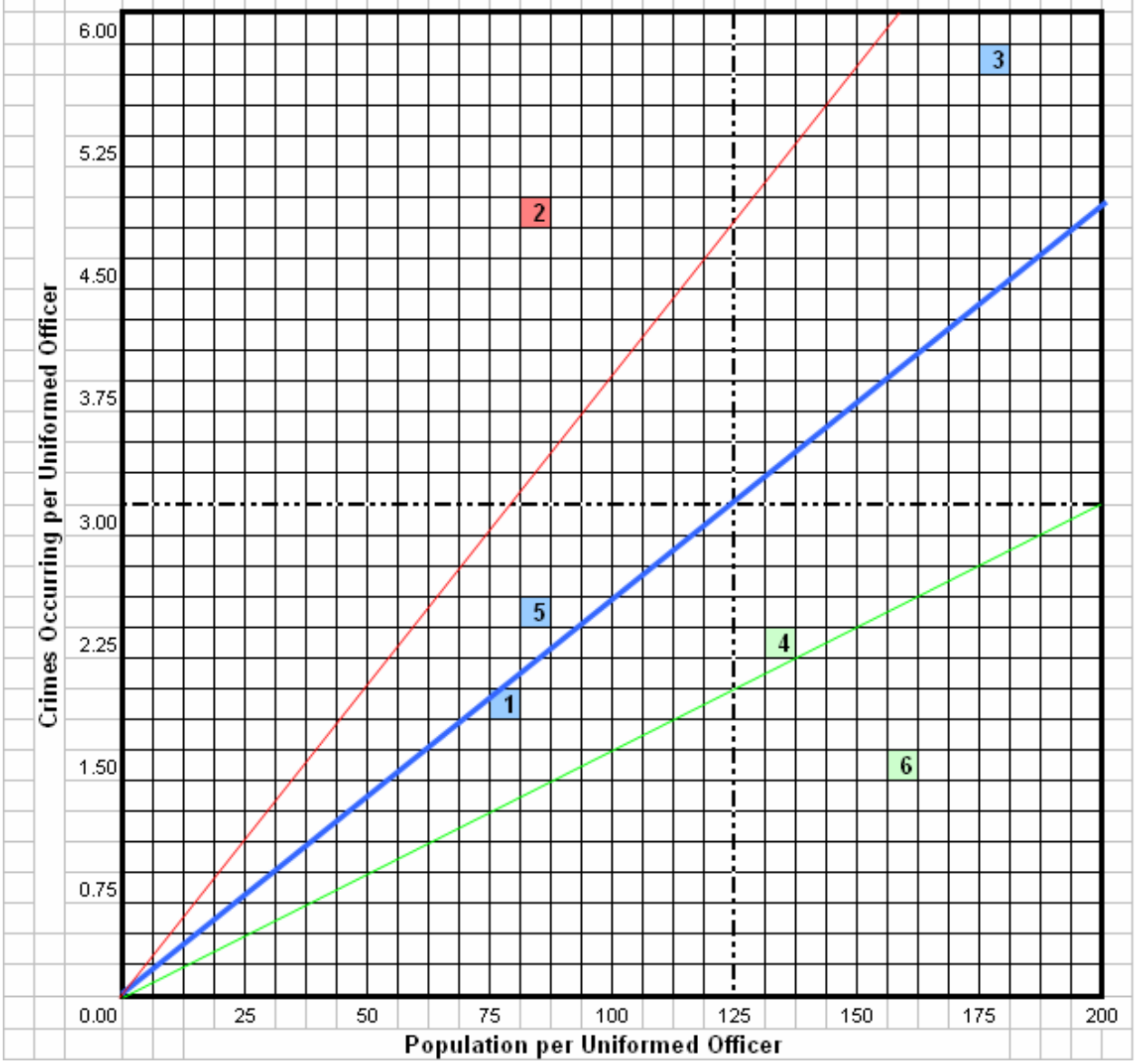


Figure 6. Relationship of Crimes and Population with the Number of Officers At UT System Non-Health Science Centers

	UT System Non-HSC Campuses	C t Of	P t Of
1	UT Arlington	15.80	624.40
5	UT El Paso	8.10	430.20
2	UT Austin	9.60	492.10
4	UT Dallas	6.80	399.50
8	UT San Antonio	5.60	396.00
6	UT Pan AM	8.70	739.50
3	UT Brownsville	8.30	666.10
9	UT Tyler	8.10	583.30
7	UT Permian Basin	4.60	232.30
	UT System High Avg	9.53	444.75
	UT System Avg	8.40	507.04
	UT System Low Avg	7.68	596.23

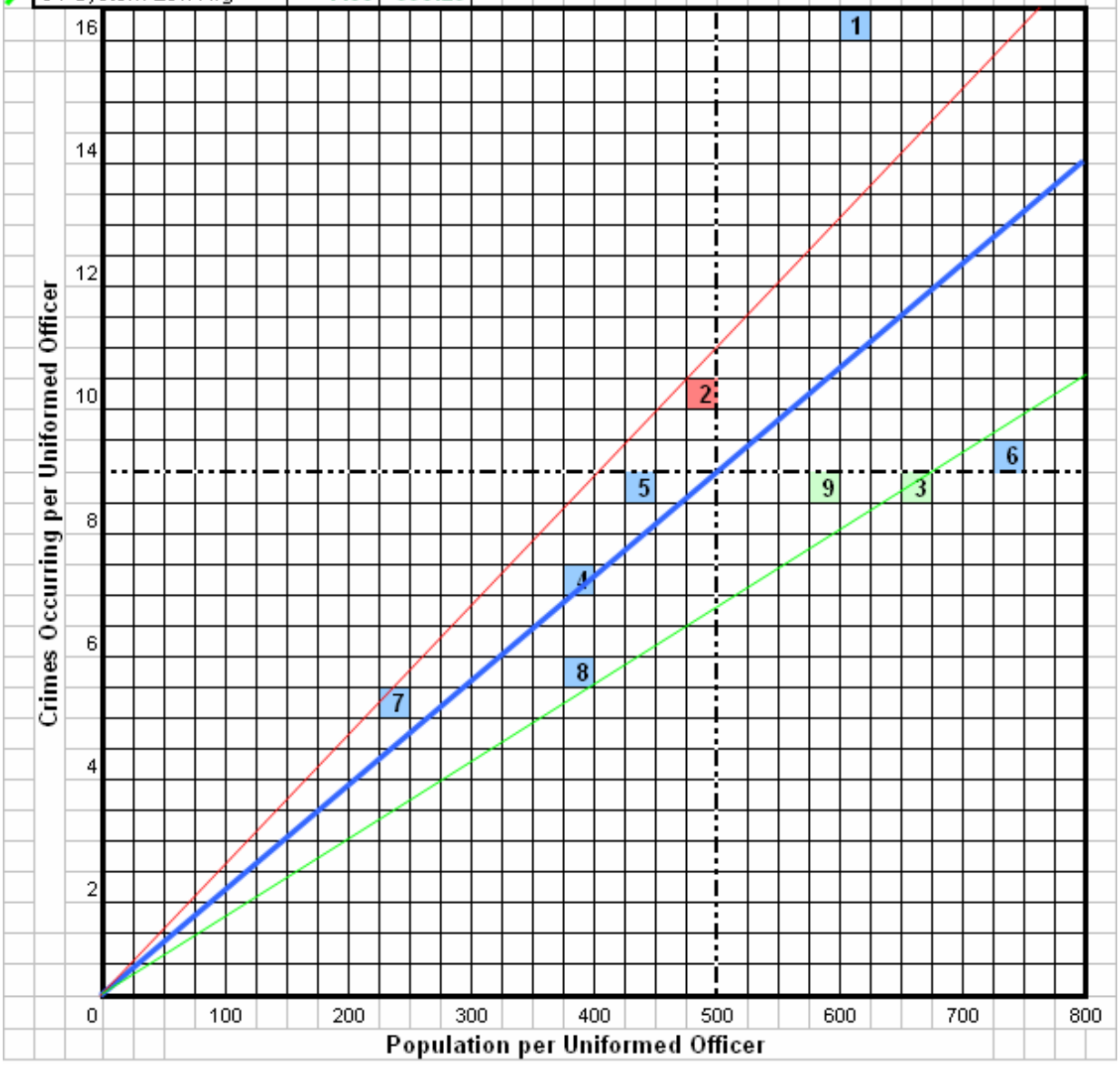


Figure 7 shows the relationship of crimes on HSC Campuses per 1000 person with crimes occurring in local city per 1000 persons. Figure 8 does this same comparison for Non-Health Science Centers. Each of the represented schools is designated by two numbers. The campus-crime ratio (Campus) is provided next to the schools name. This (Campus) number is produced by taking the total number of Part I and Part II crimes occurring on the campus and dividing it by a population factor (per 1000) on the respective campus. The city-crime ratio (City) is also provided. This (City) number is produced by taking the total number of Part 1 crimes occurring in the city and dividing it by a population factor (per 1000) in the local city. The resulting numbers representing the school is then plotted indicating the relationship with the remaining HCS campuses in respect to its ability to suppress campus crime influenced by the local city crime. The tri-colored block in the upper right of Figure 7 is color-coded indicating a less desirable (red), average (blue) and desirable (green) locations on the plotted graph. The graph also shows a projection lines. The area of the red line establishes an undesirable area and represents an average of those schools plotted above the blue average line. As one moves down away from the red line, one approaches the blue line (the average projection line) and represents an average of all schools sampled. The green projection line severs a desirable area on graph and represents those schools plotted below the blue average line. The horizontal dotted line provides the average of HSC Campuses crimes per 1000 persons occurring on the campus. Above the dotted line indicates a higher crime rate per 1000 persons and below the dotted line is a below average crime rate. The vertical dotted line provides the average of local city crimes per 1000 persons occurring in the local city. Left of the dotted line indicates a lower number of crimes per 1000 persons occurring in the city and to the right, a higher number of crimes occurring in the local city.

This graph indicates that all schools fall into the average area or within the blue range. This indicates all Health Science Center Campus are near the UTHSC average when measuring

the influence of crime from the local city. This indicates that all the sampled campuses are subject to the city environment and those crimes in the local city have a direct correlation to crimes committed on Health Science Center campuses.

Figure 7 indicates that the UTHSC in San Antonio (a blue 6 icon) has the lowest crimes per 1000 person on campus within a city experiencing average amount crimes per 1000 persons. This is a good position on the graph. This graph also indicates that UT Southwest Medical Center Dallas (a blue 2 icon) has the highest crimes per 1000 person on campus within a city experiencing a very high average of crimes per 1000 persons.

Figure 7. Relationship of Crimes on HSC Campuses with Local City Crime

	Crimes per 1000 Persons		
		Campus	City
2	UTSWMC Dallas	53.70	95.10
3	UTMB Galveston	29.70	87.90
1	UTMD Anderson	24.30	69.40
5	UTHSC Tyler	25.30	72.00
4	UTHSC Houston	15.60	69.40
6	UTHSC San Antonio	9.40	72.90
	UT System High Avg	**53.70**	**95.10**
	UT System Avg	**26.33**	**77.78**
	UT System Low Avg	**20.86**	**74.32**

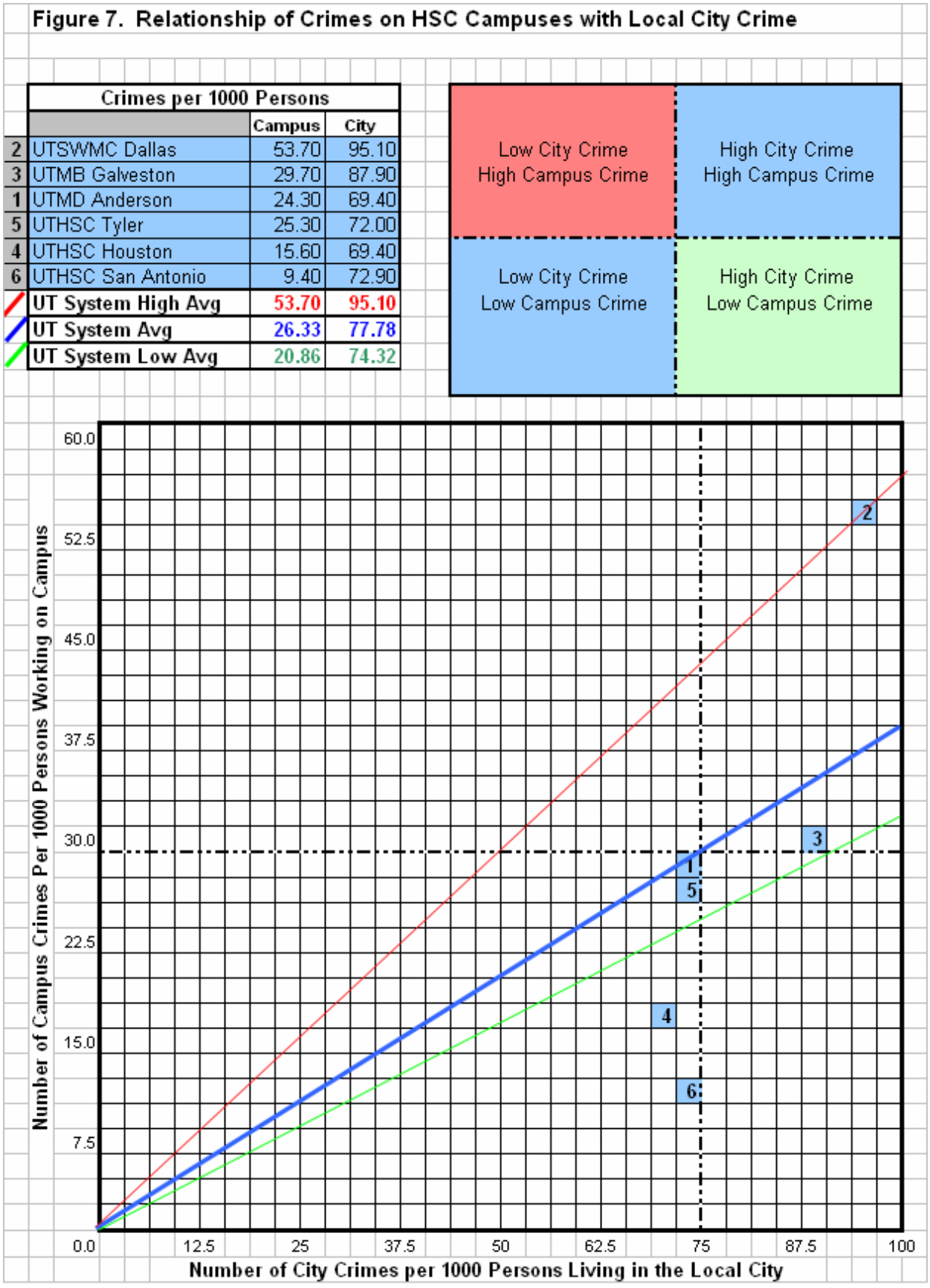
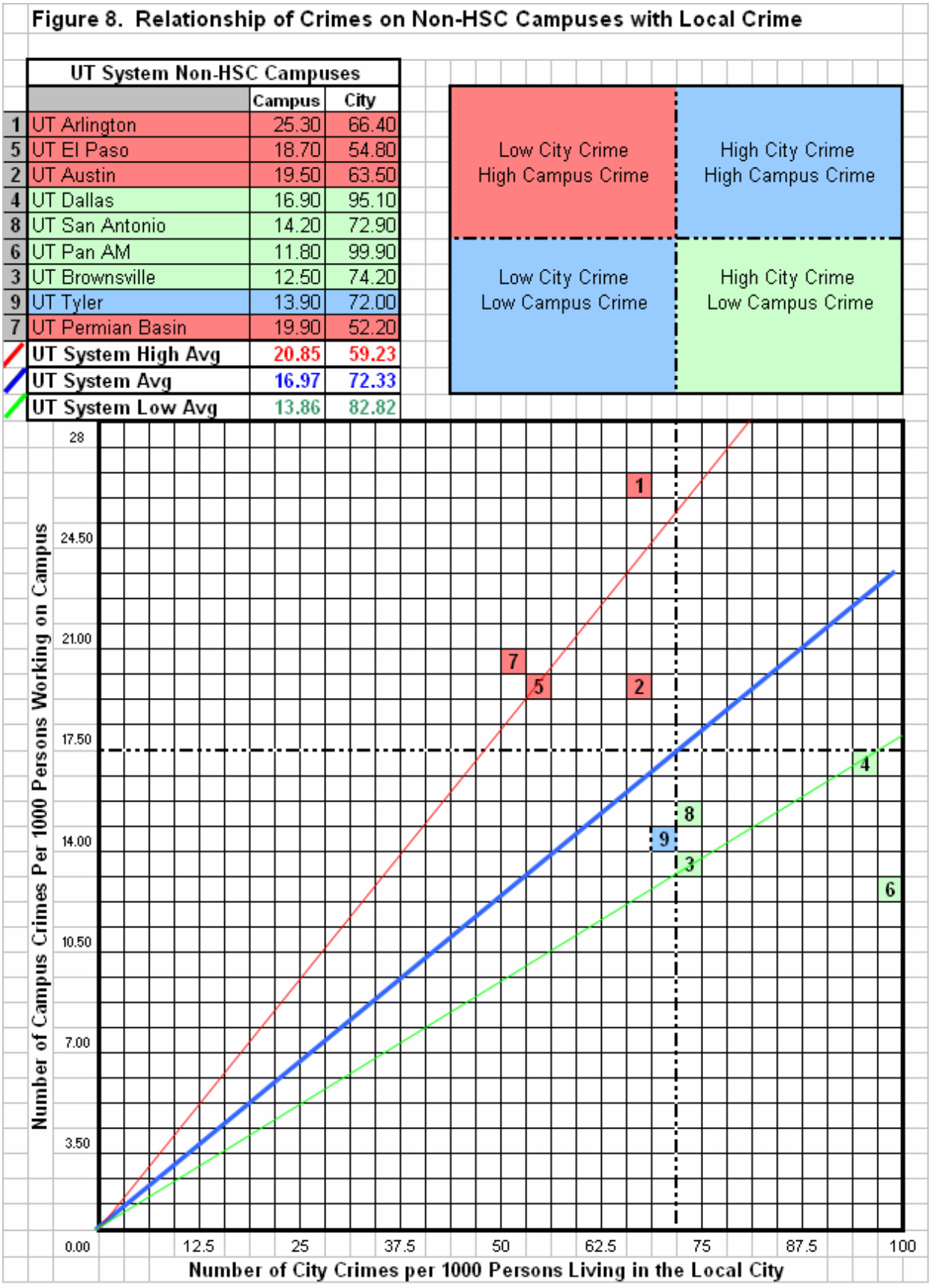


Figure 8. Relationship of Crimes on Non-HSC Campuses with Local Crime

	UT System Non-HSC Campuses	Campus	City
1	UT Arlington	25.30	66.40
5	UT El Paso	18.70	54.80
2	UT Austin	19.50	63.50
4	UT Dallas	16.90	95.10
8	UT San Antonio	14.20	72.90
6	UT Pan AM	11.80	99.90
3	UT Brownsville	12.50	74.20
9	UT Tyler	13.90	72.00
7	UT Permian Basin	19.90	52.20
	UT System High Avg	**20.85**	**59.23**
	UT System Avg	**16.97**	**72.33**
	UT System Low Avg	**13.86**	**82.82**



Figures 9 and 10 extrapolate information for the previous figures 5 through 8 and were developed to complete the objective of this research paper. Figures 9 and 10 indicate how many officers are required to effectively man a UTHSC at San Antonio Police Department and may assist in determining the number of officers at any UT System Police Department. Figure 9 plots the campuses by campus population and by the number of uniformed officers working on the campus. Figure 10 does the same for Non-Health Science Centers.

Figure 9 represents each UT System school on the plotted graph with two numbers. The population (Populat) is provided next to the schools name. This (Populat) number is produced by noting the actual number of all persons working and attended school on the campus. The officer (Officers) is also provided. This (Officers) number is produced by noting the actual number of all uniformed officers as the Police Department on the respective campus. The resulting numbers representing the school is then plotted indicating the relationship with the remaining HCS campuses to compare the officer and population factors. The tri-colored block in the upper right of Figure 9 is color-coded indicating a less desirable (red), average (blue) and desirable (green) locations on the plotted graph. The graph also shows a projection lines. The area of the red line establishes an undesirable area and represents an average of those schools plotted above the blue average line. As one moves down and away from the red line, one approaches the blue line (the average projection line) and area represents an average of all schools sampled. The green projection line serves a desirable area on graph and is the average of all schools plotted below the blue average line. The horizontal dotted line provides the average number of uniformed officers on all HCS campuses. Above the dotted line indicates a higher than average number of uniformed officers on the campus and below the dotted line is a below average number of uniformed officers. The vertical dotted line provides the average the total population of all persons on all UTHSC campuses. Left of the dotted line indicates a lower than average campus population and to the right, a higher than average campus population.

Figure 9. Efficient Manpower Level Projections on HSC Campuses

	UT System HSC Campuses	Populat	Officers
2	UTSWMC Dallas	8171	37.00
3	UTMB Galveston	16053	36.00
1	UTMD Anderson	11932	41.00
5	UTHSC Tyler	1422	3.00
4	UTHSC Houston	8810	29.00
6	UTHSC San Antonio	9431	27.00
	Avg of Red Group	8490.5	33.00
	Avg of Blue Group	9303.2	28.83
	Avg of Green Group	9121	28.00

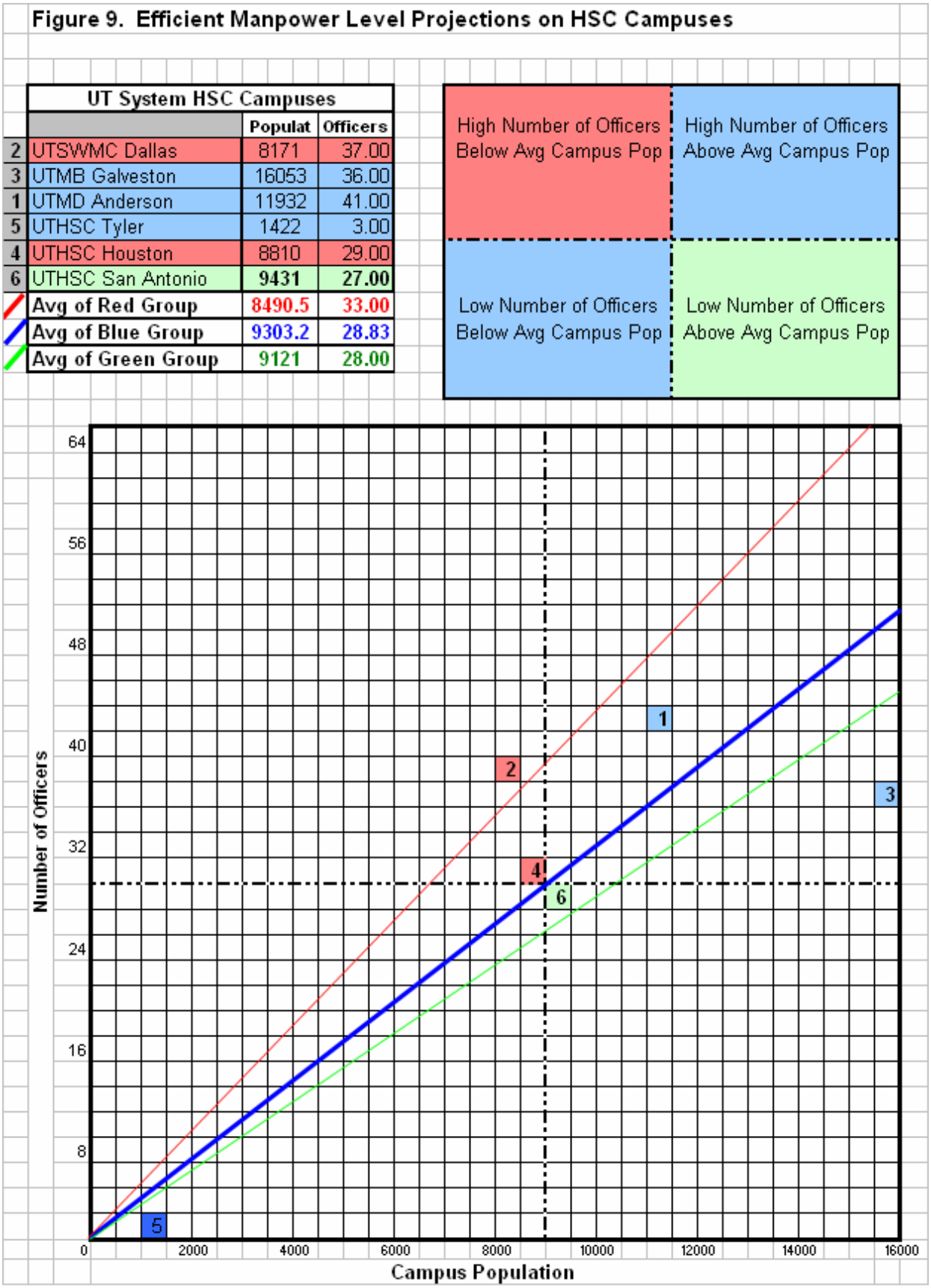


Figure 10. Efficient Manpower Level Projections on Non-HSC Campuses

	UT System Non-HSC Campuses	Populat	Officers
6	UT Pan AM	17008	16
3	UT Brownsville	12656	12
1	UT Arlington	26849	23
9	UT Tyler	4666	4
2	UT Austin	75293	57
5	UT El Paso	21078	20
4	UT Dallas	15582	18
8	UT San Antonio	24159	33
7	UT Permian Basin	3020	5
	Avg of Red Group	75293	57.00
	Avg of Blue Group	22257	20.89
	Avg of Green Group	8661	8.00

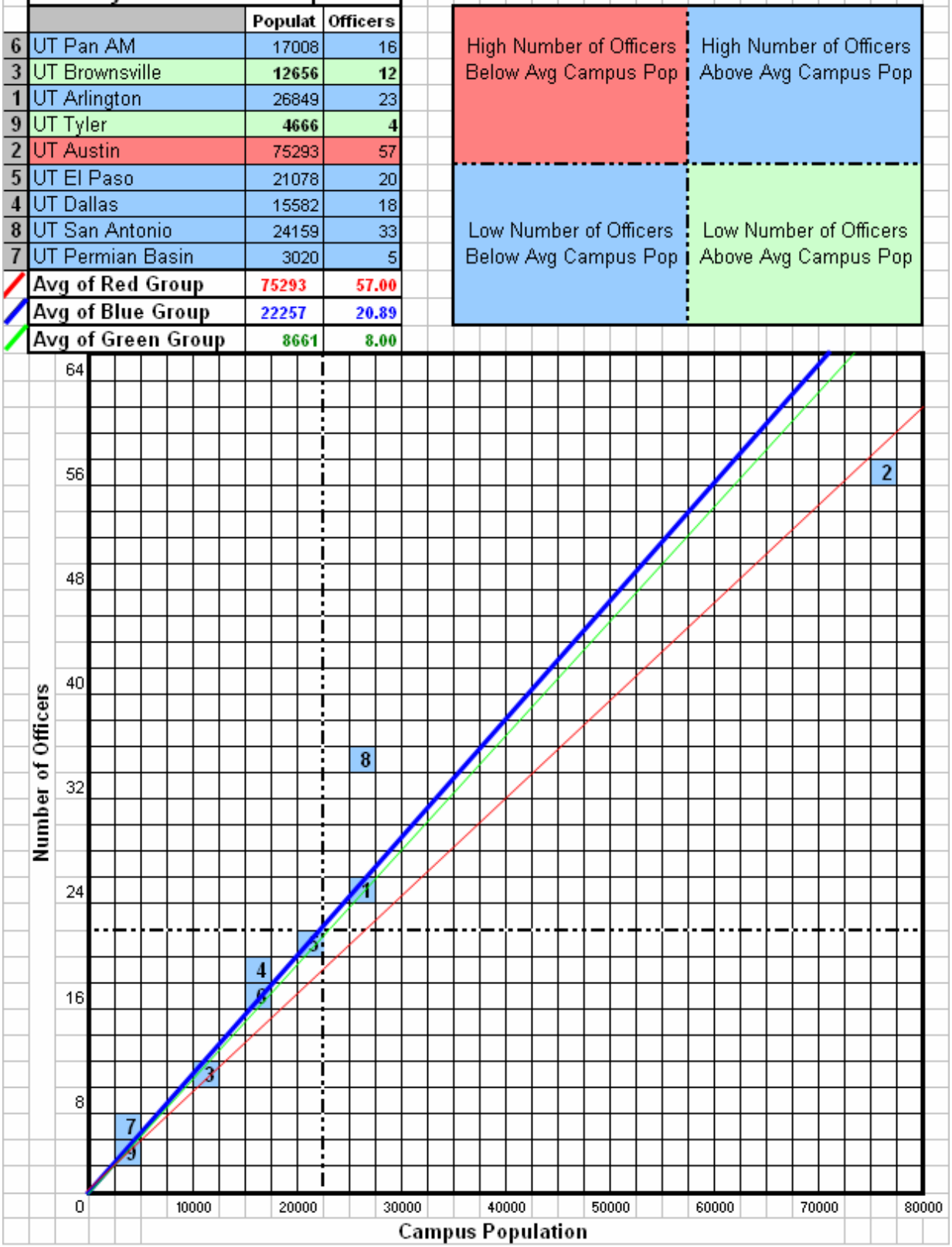


Figure 9 indicates the University of Texas (UT) HSC in San Antonio (a green 6 icon) has one of the three highest campus populations but one of the two lowest numbers of uniformed officers. When you consider that the UTHSC in San Antonio experiences the least number of crimes per officer and the has the highest ratio of officers to campus population ratios (Figure 5) and experiences the least amount of campus crimes per 1000 persons, then the UTHSC in San Antonio must be identified as an efficient police department that is controlling the occurrence of crime on its campus. UTHSC Houston experiences very similar ratios and is considered to be an efficient campus. This graph also indicates that UT Southwest Medical Center Dallas (a red 2 icon) has one of two highest numbers of police officer but has one of the two lowest numbers of campus populations when comparing UTHSC campuses.

More importantly, the green projection line serves as a projected average of all efficient HSC campuses and indicates the most efficient number of officers expected to efficiently control crime on campuses with a population up to 80,000 persons. The blue projection line serves as a projected average of campuses determined as statistically average when compared to UTHSC campuses. It also projects the average number of uniformed officers expected to control crime on campuses with a population up to 80,000 persons. And finally, the red projection line serves as a projected average of the remaining campuses. To give an example of how the graph could be used, if a dramatic increase in the number of students occurred at a University of Texas Campus from 20,000 students to 25,000 students, one could estimate the proper number of officer to have at 22 to 23 uniformed officers, following the blue line at 25,000 population. Ultimately, any campus may elect to use the blue line (average efficiency), and elect to have 28 or 29 uniform officers or green line (Most efficient) opted for 26 officers when efficient officers are determined.

Certainly, the UTHSC San Antonio has proven itself to be sufficiently reducing the occurrence of crime on the campus and there would not be any reason to reduce the manning

levels. However, if the Chief Administrator at the UTHSC San Antonio Campus wished to increase manning at the campus it would be safe to assume that a range of could be created from these projection lines and formulate the most efficient or at less that efficient manning levels, if desired. Currently, these research projections indicated that approximately 26 police officers are needed at the UTHSC in San Antonio to resource the department at the efficient level while approximately 29 police officers are projected to resource the department at an acceptable average in regards to the UT System Health Science Centers.

CONCLUSION

During this research, it became apparent to this researcher that there were many areas within law enforcement where the effective utilization of police personnel may stray from efficiency. Organizational strategies need to be developed that address the crime factors affecting unique local area and specific community concerns. Even neighboring police departments may base their distribution of patrol officers on uniquely different residential populations with varying ethic composition, or traffic enforcement considerations or even based on their needs on sounding alarms of commercial property. This researcher found it necessary to conduct efficiency analysis by comparing UCR crime data from similar police jurisdictions by measuring how well the patrol division meets the community needs and how efficiently crime was controlled on these campuses. Still another reason to conduct an efficiency analysis should be to establish patrol beats of equal workloads among the patrol officers. Workloads should be somewhat based on “time-consumed” system of calls, a weighted system of crime factors and the response times to incidents.

Eventually, a critical decision must be made to divide available human resources based on the findings from an efficiency analysis, local crime factors and other known community needs. A police department with above average number of patrol division officers might

consider the development of a specialized task force and /or use saturation patrols. Those departments with less than the average number of patrol division officers must look for ways to provide additional officers to maximize efficiency and support to the patrol division in its effort to complete the organizational strategy and law enforcement mission.

As there is no one most effective system that works for all department sizes and community variation, there is the recommended method use in this research. Figure 9 and Figure 10 provide an approximate number of police officers necessary to provide expected law enforcement presence and efficiently control crime within UT System campus communities. The manning projections are based on norms and averages of crimes occurring at UT System campuses using 2001 UT System campus' statistics. More importantly it is assumed that a majority of the Chiefs of Police within the UT System have considered a majority of the crime factors relating to the unique communities within the UT System Universities. In doing so, these Chief Administrators have collectively established manning ratios; UCR crime averages and expected manning levels that have provided unique understanding of the projected manning levels found in Figures 9 and 10.

Essentially, effective manpower distribution norms and crime statistic averages should not be derived by crime factors of dissimilar communities. However, by analyzing similar communities with similar crime factors one may establish expected norms and averages. It was the intent of this researcher and this paper to provide a graph that might assign the most efficient amount of officers to the University of Texas Health Science Center at San Antonio Police Department. These graphs completed this task. However, these graphs and the data they provide offer unique information on expected manning levels and strengths for patrol divisions within the UT System family of universities. These calculated strengths considered the need for maximizing efficiency while projecting manning levels for any size university in the UT System.

It is concluded that the current method of staffing patrol personnel at most police departments is out of date and in question. The graphs provided in this research visually and statistically assist to provide expected manpower efficiency within UT System police departments. UT System Administrators and their police departments should benefit from the method and the range of manpower strengths projected in this research.

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