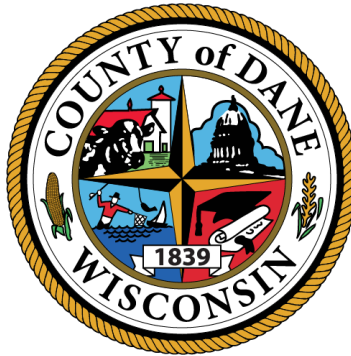# Dane County, Wisconsin

Dane County Jail and Sheriff's Office
Updated Jail Data Analysis & Forecasts

FINAL REPORT

December 13, 2018

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Dane County Population Analysis Update

Introduction

This report constitutes an update to the Dane County Jail Update Study of 2016. Specifically, this report updates the Jail Data Analysis and Forecast sections of the 2016 report. As such, the present analysis provides a status check of a variety of key jail population indicators as well as an evaluation of the forecasts presented in 2016. Utilizing the same time series analysis approach, an updated forecast model was developed. It should be noted at the outset, however, that our forecast guidance from the 2016 report is relatively unchanged. What is different is that the forecast models used are a better fit for the Dane County data thanks to improvements in forecasting software which have come about in the last two years. A better fitting model should improve upon the performance of the 2016 forecast and hopefully provide concise direction regarding the jail's population. For the most part, this report updates the statistics presented in the 2016 report. A notable improvement is that the current report provides more directly calculated average daily population information for certain population components. In short, this report capitalizes on the experience and lessons learned during the execution of the 2016 analysis.

In terms of results, this report echoes one of the key findings of the 2016 report: Absent a major change in the policies and practices which impact the Dane County Jail's population, the population will stay remarkably stable for the foreseeable future. Although this is good news, there is some cause for concern. The jail's 2018 average length of stay, a key driver of the jail's population, is slightly ahead of 2017. Both years had higher ALOS numbers than measured for any year prior to 2016. If this trend continues unchecked, the jail's population is at risk of growing, especially if the number of bookings into the jail increases. Every effort should be made to stabilize and reduce the jail's average length of stay.

Data Sources

This analysis contains some updated basic statistical facts regarding the Dane County Jail's 'under roof' population between January 2016 and November 2018. The 'under roof' population excludes individuals who are on the Dane County Sheriff's Office Electronic Monitoring program. It must be noted that the 'actual' average daily population (ADP) for whom the Sheriff's Office is responsible includes both the 'under roof' as well as electronic monitoring populations. The analysis is based on a series of files produced by the Dane County Sheriff's Office that contain a variety of population factors dating back to January 1, 2016. These files were linked and merged prior to final analysis, in essence creating a relational database of key population factors.

The key parameter governing all of the data files for this study is that every single individual held between January 1, 2016 and November 30, 2018 are included, regardless of actual booking and release dates. In other words, this analysis includes individuals who were booked prior to January 1, 2016 but may have been released during the time span of the study. This allows the research team to directly calculate average daily populations of key components of the jail's population rather than having to engage in multiple calculations which run the risk of error. In addition, this approach enabled the creation of a snapshot of

the jail's population from the moment the files were executed without having to request the creation of such a snapshot. All told, 18,595 individuals had 37,330 unique jail stays in connection with 82,733 distinct charges during the time period analyzed.

Population Profile

Demographics

The current study represents an upgrade to the prior 2 examinations of the Dane County Jail by being able to develop historical ADP statistics. Most of the population analysis of the 2014 study was tied to a single point in time snapshot, while a significant portion of the 2016 update was based on booking counts between 2011 and March 2016, and, where possible, estimates of bed day proportions. The present study analyzed the data in such a manner that the ADP numbers for a wide variety of subgroups within the population were reconstructed.

Males constituted 86.1% of the population in the 2014 study and 78.7% of the bookings in the 2016 update. To illustrate how both numbers can be accurate at the same time, consider the following two tables. The first table presents the count of bookings during the current study's time frame of 2016 to 2018. Males constitute nearly 78% of the booking count. However, due to differences in Average Length of Stay (ALOS), the daily proportion of males in the Dane County Jail's population is different. The second table is based on a reconstruction of the jail's population during the nearly 3 years of data covered in the present study. Note that black inmates during the present study constitute 38.5% of the bookings in Table 1 but 47.6% of the ADP in Table 2.

Table 1 – Dane County Jail Bookings By Race & Gender Between 2016 & 2018

	Males		Females		Total	
	Number	%	Number	%	Number	%
Black	11,857	31.8%	2,505	6.7%	14,362	38.5%
White	16,501	44.2%	5,544	14.9%	22,045	59.1%
Other	710	1.9%	213	0.6%	923	2.5%
Total	29,068	77.9%	8,262	22.1%	37,330	100.0%

Table 2 – Dane County Jail ADP By Race & Gender Between 2016 & 2018

	Males		Females		Total	
	Number	%	Number	%	Number	%
Black	334.7	44.0%	27.4	3.6%	362.1	47.6%
White	310.7	40.9%	72.1	9.5%	382.8	50.3%
Other	12.4	1.6%	3.2	0.4%	15.6	2.1%
Total	657.9	86.5%	102.6	13.5%	760.5	100.0%

The proportion of black inmates in the booking count has increased to 38.5% (from 37.1% in 2016). However, in the ADP, black inmates constitute 47.6% in the present study, down

slightly from the 48.1% of the 2016 analysis. The juxtaposition of the booking proportion and ADP proportion is due to the higher ALOS of black inmates, a topic addressed later in this report. We see a similar but less pronounced pattern for males, with approximately 78% of bookings but 86.5% of the population. The booking proportion represents a slight decrease from 2016 when males were responsible for 79% of the bookings.

The figures below depict both the booking and ADP proportions for the Dane County Jail by both race and gender during the 2016 – 2018 period.

Figure 1 – Dane County Jail Bookings By Race

Dane County Bookings By Race, 2016 - 2018

Black, 38.5%
Other, 2.5%
White, 59.1%

Figure 2 – Dane County Jail ADP By Race

Dane County Jail Population By Race, 2016 - 2018

Black, 47.6%
Other, 2.1%
White, 50.3%
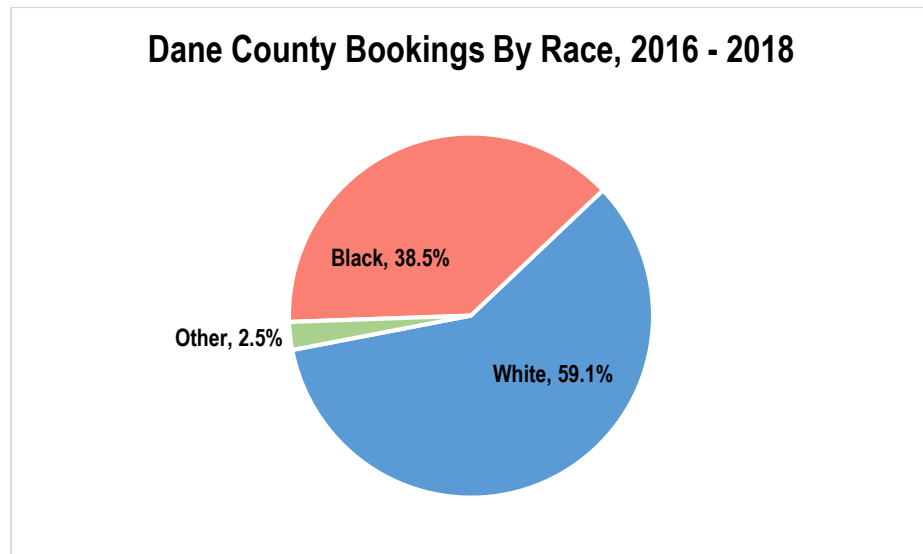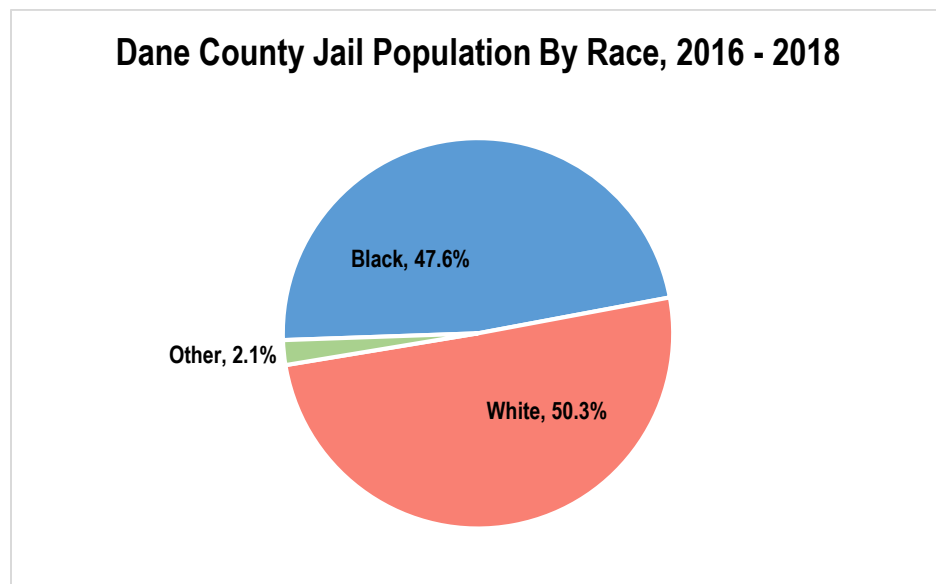
Figure 3 – Dane County Jail Bookings By Gender

Dane County Bookings By Gender, 2016 - 2018
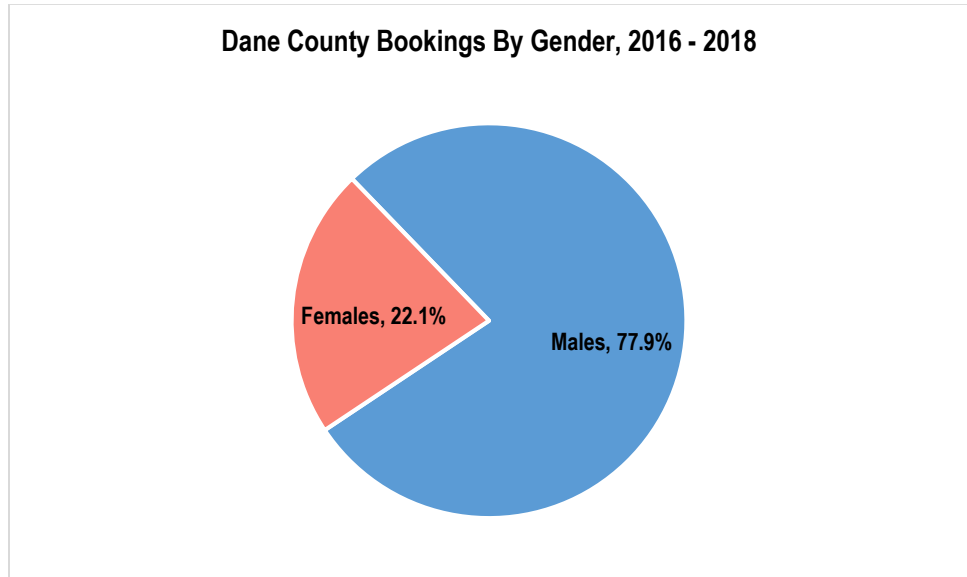
Figure 4 – Dane County Jail ADP By Gender

Dane County Jail Population By Gender, 2016 - 2018
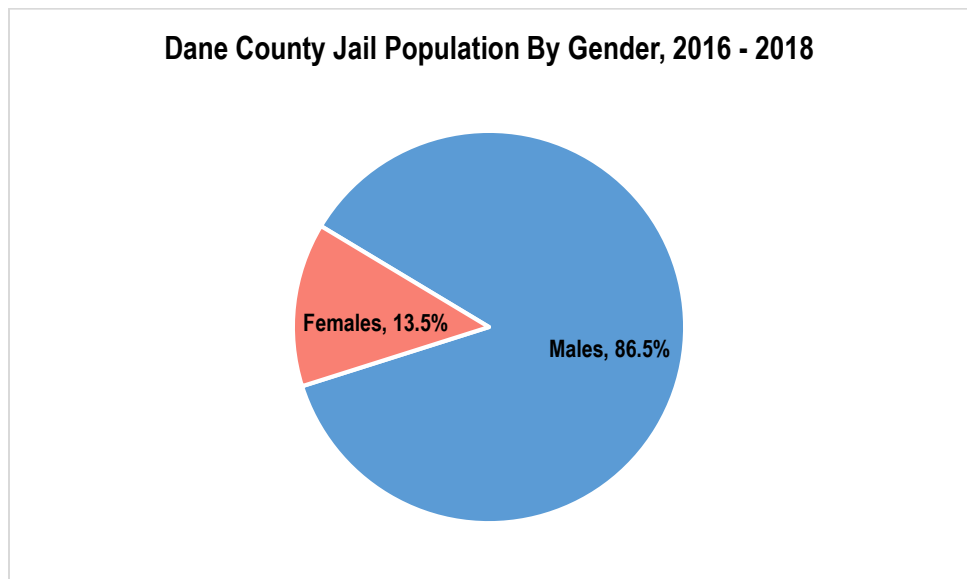
Tables 3 and 4 below depict both bookings and ADP by Hispanic or Latino ethnicity. These tables show a remarkable stability between the proportion of bookings and the proportion within the ADP. As will be discussed later, the ALOS of Hispanic inmates is fairly similar to the ALOS of Non-Hispanic inmates.

Table 3 – Jail Bookings By Hispanic Ethnicity & Gender Between 2016 & 2018

	Males		Females		Total	
	Number	%	Number	%	Number	%
Hispanic	2,378	6.4%	416	1.1%	2,794	7.5%
Non-Hispanic	26,690	71.5%	7,845	21.0%	34,535	92.5%
Total	29,068	77.9%	8,262	22.1%	37,330	100.0%

Table 4 – Jail ADP By Hispanic Ethnicity & Gender Between 2016 & 2018

	Males		Females		Total	
	Number	%	Number	%	Number	%
Hispanic	54.3	7.1%	3.6	0.5%	57.9	7.6%
Non-Hispanic	603.5	79.4%	99	13.0%	702.5	92.4%
Total	657.9	86.5%	102.6	13.5%	760.5	100.0%

Table 5 provides a quick comparison of the booking counts by age group between the 2016 and 2018 analyses. The age proportion of the bookings is similar to that which has been witnessed nationally in recent years---incarcerated populations are trending older. In this instance, we see decreases in bookings under the age of 25 and increases in the 25 to 40 age group. There is also an increase in bookings of people over the age of 55.

Table 5 – Dane County Jail Inmate Bookings By Age

Age Group	2018 Study		2016 Study	
	Number	%	Number	%
Below 20	2,499	6.7%	5,300	8.0%
20 - 24.9	6,318	16.9%	13,750	20.7%
25 - 29.9	7,293	19.5%	12,143	18.3%
30 - 34.9	5,942	15.9%	9,734	14.7%
35 - 39.9	4,797	12.9%	6,444	9.7%
40 - 44.9	2,862	7.7%	5,602	8.4%
45 - 49.9	2,667	7.1%	5,197	7.8%
50 - 54.9	2,198	5.9%	4,283	6.5%
55 - 59.9	1,578	4.2%	2,184	3.3%
60+	1,176	3.2%	1,733	2.6%
Total	37,330	100.0%	66,370	100.0%

The overall age of individuals booked into the jail is increasing. In our 2016 study, the median age at booking for all inmates was 31 years and the mean age was 33.8 years. For inmates held between January 1, 2016 and November 30, 2018, the median age was 32 years and the mean age was 34.6 years. The charts below presents the age distribution of

bookings as well as the inmate ADP. Note that the percentages are fairly close, but there are interesting differences such as inmates under 20 years of age constituting 6.7% of the bookings but only 5.4% of the ADP. We see the same pattern for inmates over 45 years of age. Meanwhile, the reverse is true for inmates between 20 and 45 years of age---higher proportions within the ADP than within the booking distribution. The driver of these patterns is differences within ALOS a topic which is addressed in detail later in this report.

Figure 5 – Dane County Jail Inmates By Age At Booking

Dane County Inmates By Age At Booking, 2016 - 2018
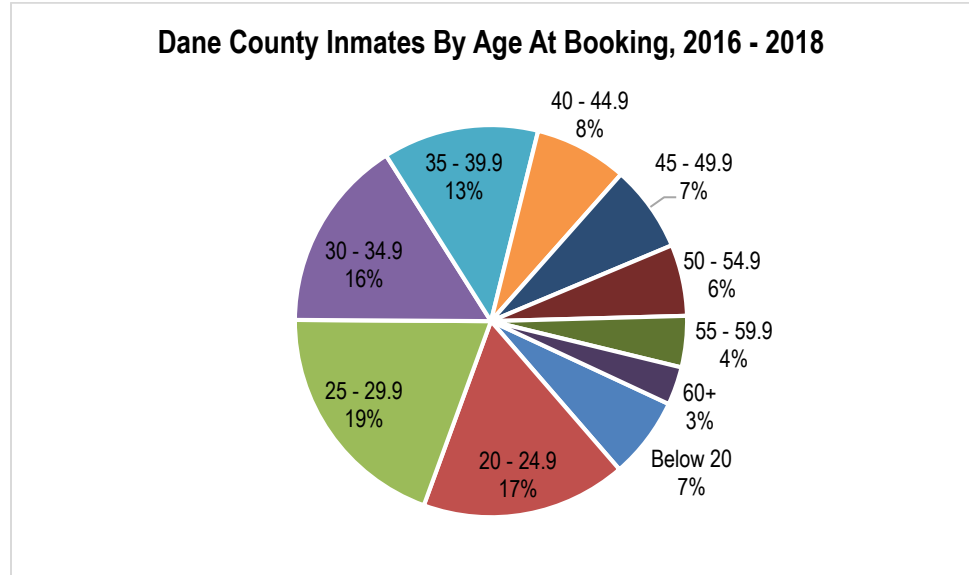
Figure 6 – Dane County Jail ADP By Age At Booking

Dane County ADP By Age At Booking, 2016 - 2018
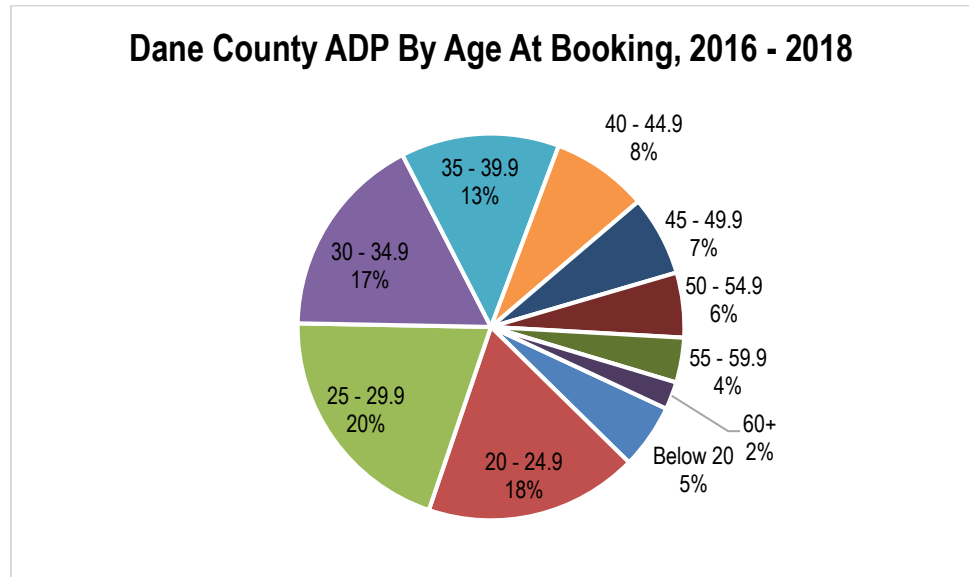
Judicial Status

One of the complexities involved in jail operations is the fact that the population has significant variations in terms of the stages of the criminal justice process. A jail's population ranges from recent arrestees with brand new cases to inmates serving sentences and inmates who have violated the terms of community supervision and have returned to custody. This judicial status provides an important context with which to understand the jail's population as well as the criminal justice system. The Dane County Jail's inmate management system contains a detailed judicial status indicator with 30 categories. For the purposes of the current study, the table below shows how we classified these categories into 5 key groups. Note that inmates who have received a state prison sentence are broken out into a "State Sentenced" category.

Table 6 – Judicial Status Values Classified Into Categories

Judicial Status Field Value	Category
County Prearraignment	Pretrial
County Prearraignment Hold	Pretrial
County Pretrial	Pretrial
County Pretrial Hold	Pretrial
County Pretrial Probation Hold	Pretrial
Municipal Prearraignment	Pretrial
Municipal Prearraignment Hold	Pretrial
Presentence Investigation	Pretrial
Presentence Investigation Hold	Pretrial
Presentence Investigation Probation Hold	Pretrial
Probation/Parole Violation Hold	Probation/Parole Violator
Probation/Parole Violation Outside Hold	Probation/Parole Violator
Extended Supervision No Work Release Outside Hold	Sentenced
Extended Supervision Sanction No Work Release	Sentenced
Extended Supervision Sanction With Work Release	Sentenced
Probation Sent No Work Release	Sentenced
Probation Sent Work Release	Sentenced
Probation Sent Work Release Revoked	Sentenced
Sentenced Huber	Sentenced
Sentenced Huber Probation Hold	Sentenced
Sentenced Huber Revoked	Sentenced
Sentenced/Outside Hold	Sentenced
Sentenced/Outside Hold Huber	Sentenced
Sentenced Without Huber	Sentenced
State Prisoner Intransit	State Sentenced
State Prisoner Writ	State Sentenced
[Blank or Missing]	Other
Federal Prisoner Intransit	Other
Non-Federal Prisoner Intransit	Other

Table 7 below relates the Dane County Jail's ADP by judicial status between 2016 and 2018. It should be noted that Federal 'In Transit' inmates are categorized as 'Other' as well as inmates who are in custody solely due to holds for other agencies/jurisdictions.

Table 7 – Dane County Jail ADP By Judicial Status, 2016 - 2018

	ADP	%
Pretrial	312.7	41.1%
Sentenced	216.2	28.4%
Probation/Parole Violators	160.1	21.0%
Other	71.4	9.4%
Total	760.5	100.0%

The judicial status breakdown is noteworthy because the proportion of pretrial inmates is smaller than what we would typically encounter in similarly situated jails. There is a chance that the separate treatment of probation/parole violators drives this difference in part. Moreover, the proportion of probation/parole violators is also higher than expected. The 3 tables below break out judicial status by gender, race and Hispanic ethnicity. Note that the proportions of black and white inmates by status are fairly similar. For Hispanic inmates, the distribution across judicial status is fairly consistent, with the possible exception of the 'Other' category, where Hispanic inmates, who make up 7.6% of the ADP, constitute 13% of this category.

Table 8 – Dane County Jail ADP By Judicial Status & Gender

	Pretrial		Sentenced		State Sentenced		Probation/Parole Violator		Other		Total	
	ADP	%	ADP	%	ADP	%	ADP	%	ADP	%	ADP	%
Males	274.2	36.1%	159.8	21.0%	24.8	3.3%	134	17.6%	65	8.5%	657.9	86.5%
Females	38.5	5.1%	29.5	3.9%	2.2	0.3%	26	3.4%	6.4	0.8%	102.6	13.5%
Total	312.7	41.1%	189.3	24.9%	27.0	3.6%	160	21.0%	71.4	9.4%	760.5	100%

Table 9 – Dane County Jail ADP By Judicial Status & Race

	Pretrial		Sentenced		State Sentenced		Probation/Parole Violator		Other		Total	
	ADP	%	ADP	%	ADP	%	ADP	%	ADP	%	ADP	%
Black	160.3	21.1%	84.1	11.1%	15.1	2.0%	72.8	9.6%	29.8	3.9%	362.1	47.6%
White	145.3	19.1%	101.2	13.3%	11.6	1.5%	85.6	11.3%	39.2	5.2%	382.8	50.3%
Other	7.1	0.9%	4	0.5%	0.3	0.0%	1.7	0.2%	2.5	0.3%	15.6	2.1%
Total	312.7	41.1%	189.3	24.9%	27.0	3.6%	160.1	21.1%	71.5	9.4%	760.5	100%

Table 10 – Dane County Jail ADP By Judicial Status & Hispanic Ethnicity

|	Pretrial		Sentenced		State Sentenced		Probation/Parole Violator		Other		Total	
	ADP	%	ADP	%	ADP	%	ADP	%	ADP	%	ADP	%
Hispanic	24.6	3.2%	15.8	2.1%	2.2	0.3%	6.1	0.8%	9.3	1.2%	57.9	7.6%
Non-Hispanic	288.2	37.9%	173.5	22.8%	24.8	3.3%	154	20.2%	62.2	8.2%	702.5	92.4%
Total	312.7	41.1%	189.3	24.9%	27.0	3.6%	160	21.0%	71.4	9.4%	760.5	100%

It is also instructive to subdivide the judicial status by the level of severity of the charges within the population. Table 11, below, relates these proportions.

Table 11 – Dane County Jail ADP By Judicial Status & Offense Severity

	Felony		Misdemeanor		Other		Total	
	Number	%	Number	%	Number	%	Number	%
Pretrial	227.7	29.9%	78.3	10.3%	6.8	0.9%	312.7	41.1%
Sentenced	107.7	14.2%	75.4	9.9%	6.1	0.8%	189.3	24.9%
State Sentenced	27.0	3.5%	0.0	0.0%	0.0	0.0%	27.0	3.5%
Other	119.2	15.7%	32.7	4.3%	8.1	1.1%	160.1	21.0%
Probation/Parole	24.8	3.3%	8.2	1.1%	38.5	5.1%	71.4	9.4%
Total	506.3	66.6%	194.6	25.6%	59.5	7.8%	760.5	100.0%

The felony sentenced population constitutes the largest single group of inmates in the Dane County Jail, as demonstrated in Figure 7. The majority of the 'Other' category are inmates who are 'In Transit'.

Figure 7 – Dane County Jail ADP By Judicial Status & Offense Severity

Dane County ADP By Judicial Status & Offense Severity
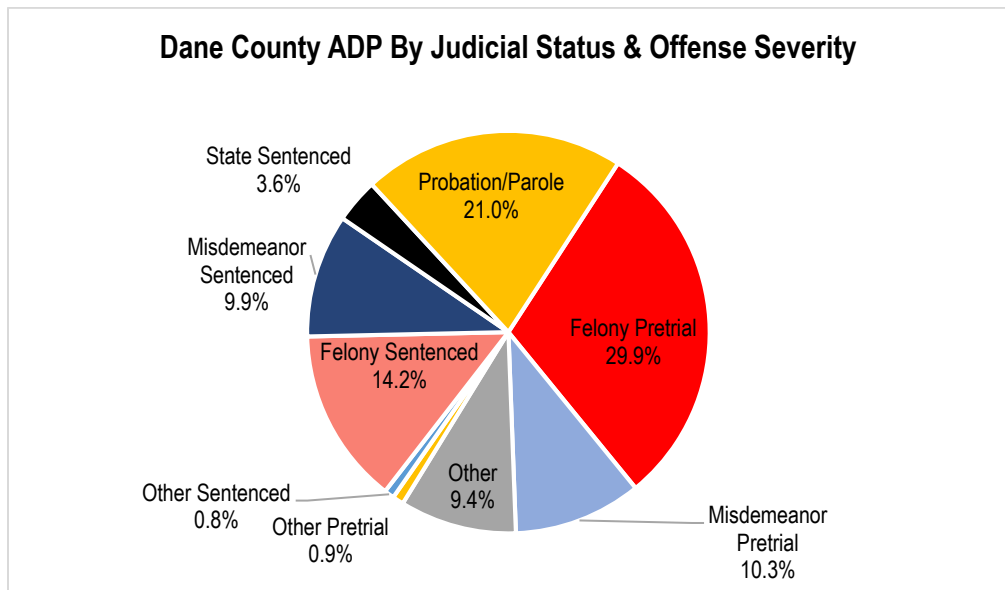
Most Serious Charge Analysis

The inmate population also faces a wide variety of charges. In order to understand the nature of the jail's population, each inmate's most serious charge was retrieved using a classification system where each charge was categorized into 1 of 12 groups. If an inmate had more than one charge, the most serious charge would be determined using the group designation below. An inmate with a violent charge and a traffic offense, for instance, would have a most serious charge of violent because the violent charge outweighs the traffic charge.

Table 12: Charge Categories Used In Most Serious Charge Analysis

Category	Offense	Category	Offense
1	Violent	7	Drug
2	Domestic Violence	8	DUI
3	Sex Offense	9	Public Order Offense
4	Weapon	10	Traffic
5	Burglary	11	Other
6	Theft/Fraud	12	Supervision Violation

A 'Public Order Offense' includes charges related to Disorderly Conduct, Contempt, Resisting Arrest, etc. In addition, there exist charge enhancers that alter the Public Order categorization (as well as some other categories) by adding penalties for Domestic Violence, Weapons, and other offenses. In the instances where an individual's most serious immediate charge was Public Order, the categorization decision was impacted by the existence of an enhancer. For example, if an individual's most serious charge category was 'Public Order' but the charge enhancer was 'Domestic Violence', the most serious charge category became 'Domestic Violence.' The 'Other' category acted as a catch all for charges that did not fit into the other 11 groups above. Some examples include, 'Federal Offense', 'Immigration Detainer', and 'Hiding a Corpse'. Finally, a Supervision Violation includes Parole and Probation Violations as well as GPS Tampering.

The table below details the booking frequency of the most serious charge categories of the inmates in the analysis in both 2016 (representing data from 2011 to the start of 2016) as well as 2018 (2016 – 2018). The table is sorted by frequency of the specific charge category in 2018. The table also represents several notable shifts in the bookings data. Violent charges have moved to the top of the list in the present study. The proportion of Domestic Violence bookings decreased.

Table 13: Bookings By Most Serious Charge Category 2016 & 2018

2018			2016		
Category	Number	%	Category	Number	%
Violent	6,479	17.4%	Public Order	10,945	16.5%
Public Order	5,555	14.9%	Violent	10,847	16.3%
DUI	4,896	13.1%	DUI	9,098	13.7%
Supervision Violation	4,820	12.9%	Supervision Violation	7,996	12.0%
Drug	4,074	10.9%	Domestic Violence	6,796	10.2%
Theft/Fraud	3,382	9.1%	Theft/Fraud	6,093	9.2%
Domestic Violence	3,183	8.5%	Drug	5,897	8.9%
Other	2,807	7.5%	Other	4,705	7.1%
Weapon	760	2.0%	Traffic	1,448	2.2%
Traffic	604	1.6%	Weapon	1,260	1.9%
Burglary	567	1.5%	Burglary	1,030	1.6%
Sex Offense	174	0.5%	Sex Offense	258	0.4%
Total	37,330	100.0%	Total	66,373	100.0%

There is a chance that these 2 shifts are related such that, for instance, a domestic assault is charged or accompanied by (and then categorized as) a regular assault. Adding the Domestic Violence and Violent proportions together for the 2 years results in 25.9% of bookings in 2018 and 26.5% in the 2016 study, a relatively small difference. Supervision Violation and Drug bookings have also increased in the current study's timeframe.

Table 14: Dane County Jail ADP By Most Serious Charge Category

	ADP	%
Violent	254.8	33.5%
Supervision Violation	84.4	11.1%
Drug	82.0	10.8%
Theft/Fraud	79.6	10.5%
DUI	62.3	8.2%
Other	55.0	7.2%
Public Order	52.0	6.8%
Burglary	31.2	4.1%
Weapon	28.8	3.8%
Domestic Violence	18.9	2.5%
Sex Offense	7.9	1.0%
Traffic	3.6	0.5%
Total	760.5	100.0%

We see very different proportions in the ADP analysis due to ALOS variations. The table above shows the ADP by most serious charge category. Note that inmates who have at least one charge considered in this analysis as 'violent' constitute a third of the jail's

population. Note also that this table is sorted by the percentage of the ADP and is naturally a bit different than the bookings tables presented earlier.

Meanwhile, the table below breaks the most serious charge category statistics by gender. Note the proportional gender differences for violent charges, which are also present for burglary and weapons (keep in mind the '6.5 to 1' males to female proportion within the ADP). We see closer than expected gender proportions for drugs and theft/fraud.

Table 15: Dane County Jail ADP By Most Serious Charge Category & Gender

	Females		Males		Total	
	ADP	%	ADP	%	ADP	%
Violent	22.0	2.9%	232.8	30.6%	254.8	33.5%
Supervision Violation	13.8	1.8%	70.6	9.3%	84.4	11.1%
Drug	15.5	2.0%	66.5	8.7%	82.0	10.8%
Theft/Fraud	21.3	2.8%	58.3	7.7%	79.6	10.5%
DUI	10.6	1.4%	51.7	6.8%	62.3	8.2%
Other	3.9	0.5%	51.1	6.7%	55.0	7.2%
Public Order	7.3	1.0%	44.7	5.9%	52.0	6.8%
Burglary	1.9	0.3%	29.3	3.9%	31.2	4.1%
Weapon	2.6	0.3%	26.2	3.4%	28.8	3.8%
Domestic Violence	3.1	0.4%	15.8	2.1%	18.9	2.5%
Sex Offense	0.1	0.0%	7.7	1.0%	7.9	1.0%
Traffic	0.6	0.1%	3.0	0.4%	3.6	0.5%
Total	102.6	13.5%	657.9	86.5%	760.5	100.0%

The racial breakdown of the most serious charge category is presented in the table below.

Table 16: Dane County Jail ADP By Most Serious Charge Category & Race

	Black		White		Other		Total	
	ADP	%	ADP	%	ADP	%	ADP	%
Violent	154.1	20.3%	95.6	12.6%	5.0	0.7%	254.8	33.5%
Supervision Violation	37.7	5.0%	45.6	6.0%	1.0	0.1%	84.4	11.1%
Drug	28.7	3.8%	52.0	6.8%	1.2	0.2%	82.0	10.8%
Theft/Fraud	29.1	3.8%	48.9	6.4%	1.6	0.2%	79.6	10.5%
DUI	16.3	2.1%	44.6	5.9%	1.3	0.2%	62.3	8.2%
Other	22.1	2.9%	30.6	4.0%	2.4	0.3%	55.0	7.2%
Public Order	28.9	3.8%	22.0	2.9%	1.2	0.2%	52.0	6.8%
Burglary	12.6	1.7%	18.1	2.4%	0.5	0.1%	31.2	4.1%
Weapon	19.8	2.6%	8.5	1.1%	0.5	0.1%	28.8	3.8%
Domestic Violence	8.8	1.2%	9.3	1.2%	0.7	0.1%	18.9	2.5%
Sex Offense	3.0	0.4%	4.9	0.6%	0.0	0.0%	7.9	1.0%
Traffic	0.9	0.1%	2.6	0.3%	0.1	0.0%	3.6	0.5%
Total	362.1	47.6%	382.8	50.3%	15.6	2.1%	760.5	100.0%

Black inmates constitute 47.6% of the ADP, so for comparison purposes, the proportions of black and white inmates by category should be similar. We see differences, however in some important areas. First and foremost, there is a significant difference between the races held due to a violent charge, with black inmates having a higher proportion than white inmates. A similar result is seen for weapons charges. Higher proportions of white inmates are held on drug, theft/fraud, and DUI.

Meanwhile, Table 17 below takes the same data and divides it by Hispanic ethnicity. Hispanics constitute 15% of the inmates who have DUI or 'Other' as their most serious offense, about twice the rate that we would expect.

Table 17: Jail ADP By Most Serious Charge Category & Hispanic Ethnicity

	Hispanic		Non-Hispanic		Total	
	ADP	%	ADP	%	ADP	%
Violent	21.1	2.8%	233.7	30.7%	254.8	33.5%
Supervision Violation	3.4	0.5%	80.9	10.6%	84.4	11.1%
Drug	6.0	0.8%	76.0	10.0%	82.0	10.8%
Theft/Fraud	2.7	0.4%	76.9	10.1%	79.6	10.5%
DUI	9.4	1.2%	52.9	7.0%	62.3	8.2%
Other	8.1	1.1%	46.9	6.2%	55.0	7.2%
Public Order	3.1	0.4%	48.9	6.4%	52.0	6.8%
Burglary	1.0	0.1%	30.2	4.0%	31.2	4.1%
Weapon	1.0	0.1%	27.8	3.7%	28.8	3.8%
Domestic Violence	1.1	0.1%	17.9	2.3%	18.9	2.5%
Sex Offense	0.3	0.0%	7.5	1.0%	7.9	1.0%
Traffic	0.6	0.1%	3.0	0.4%	3.6	0.5%
Total	57.9	7.6%	702.5	92.4%	760.5	100.0%

Table 18 below takes the most serious charge analysis and classifies it by judicial status. The percentages reflect the proportion of the entire ADP between 2016 and 2018 such that the daily average of 147.1 pretrial inmates facing at least one violent charge constitutes 19.3% of the overall ADP of 760.5. It is interesting to see the distribution of the inmates in the violent, most serious charge category. Violent pretrial inmates constitute 47% of the pretrial population and 30% of the sentenced population, but only 16% of the probation/parole violation population. The other noteworthy proportion is with the public order inmates. The 21.7 ADP of the pretrial public order inmates constitutes only 2.8% of the overall population, but are nearly 8% of the pretrial population. At first glance, given that public order offenses include such crimes as alcohol, trespassing, and false alarms, one might be tempted to view this group as being ripe for diversion. However, Dane County is already diverting a substantial proportion of people with more minor charges. A deeper analysis of this group of inmates reveals that they face a bit more concerning charges such as bail jumping, resisting/obstructing, and disorderly conduct.

Table 18: Dane County Jail ADP By Most Serious Charge Category & Judicial Status

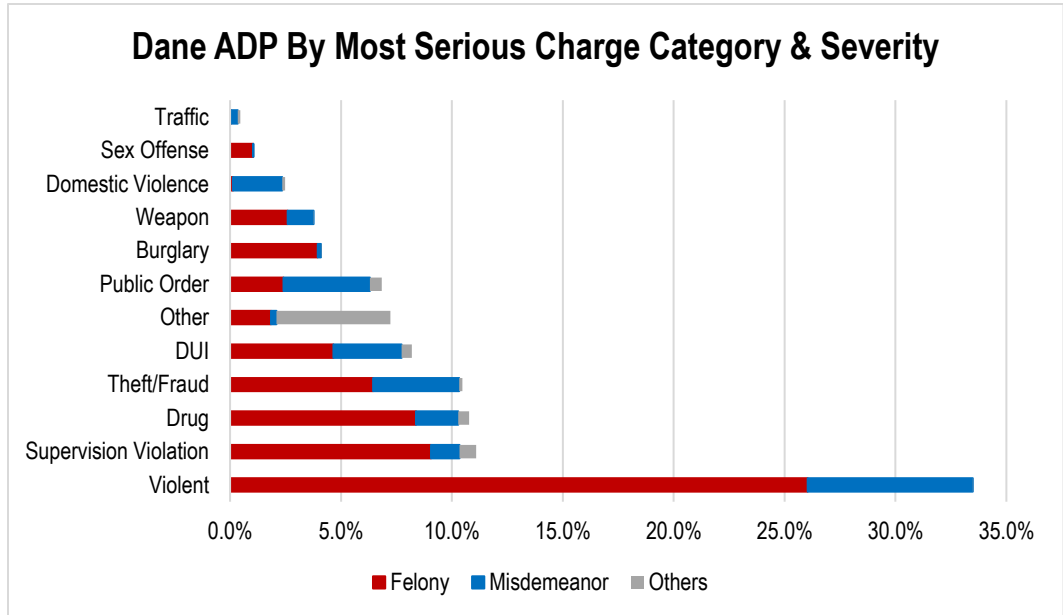|	Pretrial		Sentenced		State Sentenced		Probation/Parole Violator		Other		Total	
	ADP	%	ADP	%	ADP	%	ADP	%	ADP	%	ADP	%
Violent	147.1	19.3%	56.3	7.4%	14.0	1.8%	25.2	3.3%	12.2	1.6%	254.8	33.5%
Supervision Violation	0.1	0.0%	0.9	0.1%	0.1	0.0%	83.4	11.0%	0.0	0.0%	84.5	11.1%
Drug	34.2	4.5%	28.9	3.8%	2.8	0.4%	12.2	1.6%	3.8	0.5%	82.0	10.8%
Theft/Fraud	35.5	4.7%	23.3	3.1%	2.2	0.3%	13.7	1.8%	4.9	0.6%	79.6	10.5%
DUI	17.2	2.3%	38.2	5.0%	2.0	0.3%	3.9	0.5%	1.1	0.1%	62.3	8.2%
Other	10.6	1.4%	2.7	0.4%	0.1	0.0%	1.7	0.2%	40.0	5.3%	55.0	7.2%
Public Order	24.2	3.2%	16.5	2.2%	0.7	0.1%	7.4	1.0%	3.2	0.4%	52.0	6.8%
Burglary	16.1	2.1%	6.1	0.8%	2.9	0.4%	4.9	0.6%	1.2	0.2%	31.2	4.1%
Weapon	13.0	1.7%	6.9	0.9%	2.1	0.3%	4.1	0.5%	2.6	0.3%	28.8	3.8%
Domestic Violence	10.2	1.3%	5.5	0.7%	0.0	0.0%	2.6	0.3%	0.7	0.1%	18.9	2.5%
Sex Offense	3.7	0.5%	2.3	0.3%	0.1	0.0%	0.6	0.1%	1.2	0.2%	7.9	1.0%
Traffic	1.0	0.1%	1.7	0.2%	0.0	0.0%	0.3	0.0%	0.6	0.1%	3.6	0.5%
Total	312.7	41.1%	189.3	24.9%	27.0	3.6%	160.1	21.0%	71.4	9.4%	760.5	100.0%

The most serious charge analysis can also be broken down by the level or severity of the charge in question. Public order misdemeanants make up almost 4% of the ADP during the study's timeframe. However, they comprise over 15% of the misdemeanants. It should also be noted that the small number of misdemeanor burglaries are actually entries into locked vehicles, which we categorized as a burglary for lack of a better classification.

Table 19: Inmates By Most Serious Charge Category & Severity

	Felony		Misdemeanor		Others		Total	
	Number	%	Number	%	Number	%	Number	%
Violent	198.1	26.0%	56.6	7.4%	0.1	0.0%	254.8	33.5%
Supervision Violation	68.8	9.1%	9.8	1.3%	5.7	0.8%	84.4	11.1%
Drug	63.7	8.4%	14.5	1.9%	3.7	0.5%	82.0	10.8%
Theft/Fraud	49.0	6.4%	29.5	3.9%	1.1	0.1%	79.6	10.5%
DUI	35.4	4.7%	23.5	3.1%	3.5	0.5%	62.3	8.2%
Other	14.0	1.8%	1.9	0.3%	39.1	5.1%	55.0	7.2%
Public Order	18.3	2.4%	29.6	3.9%	4.1	0.5%	52.0	6.8%
Burglary	30.1	4.0%	1.1	0.1%	0.0	0.0%	31.2	4.1%
Weapon	19.8	2.6%	8.9	1.2%	0.1	0.0%	28.8	3.8%
Domestic Violence	1.0	0.1%	16.9	2.2%	1.1	0.1%	18.9	2.5%
Sex Offense	7.8	1.0%	0.0	0.0%	0.0	0.0%	7.9	1.0%
Traffic	0.3	0.0%	2.4	0.3%	0.9	0.1%	3.6	0.5%
Expunged	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.1	0.0%
Total	506.3	66.6%	194.6	25.6%	59.5	7.8%	760.5	100.0%

Figure 8: Dane ADP By Most Serious Charge Category & Severity

Given the fact that inmates facing a most serious charge which is violent in nature comprise the largest share of both the Felony and Misdemeanor levels in the Pretrial, Sentenced, and State Sentence statuses and the fact that the largest single group in the jail are violent felons, the bottomline conclusion is that the Dane County Jail houses a very serious inmate population.

Average Length of Stay

Jail populations are determined by 2 main factors: The number of people booked into the jail and how long those people stay. Thus far this report has classified the inmate population between 2016 & 2018 both demographically and by the nature and status of its charges. This section of the report analyzes the Dane County Jail's average length of stay (ALOS) statistics. In order to fully understand ALOS, we will subdivide it by many of the same categories used earlier.

There are 2 main ways to calculate ALOS. One commonly used method is to estimate the ALOS by using an equation that takes the ratio of the ADP to bookings during a specified timeframe. While there are some benefits to using this equation (one would only need to know a few facts about a jail's population to calculate it), it is not always entirely accurate for every institution. In the case of Dane County, where bookings do not always result in incarceration, the equation can underestimate the 'true' ALOS. In addition, this method is not useful when analyzing segments of a jail's population. Finally, it should be stated that this method, even in the best of conditions, almost never provides a result which exactly matches reality. The second method of calculating ALOS is to take everybody released in a given time period and take the mean (commonly thought of as 'average') or median (the midpoint of the data) of the individual lengths of stay.

For the purposes of this study, we calculated the ALOS using this second method, which we could achieve as we had created a database for all inmates entering the jail during the study period. The lengths of stay for all inmates released during the timeframe of the study were analyzed to obtain both the median and the mean. To simplify the analysis, we did not calculate fractions of days. If an inmate was held for a short duration, for example, a few hours on the same day, that stay is counted as 1 day. During the timeframe of this analysis, the overall mean ALOS is 23.4 days and the median is 3 days. The 2016 report also had a 23.4 day mean ALOS with a 4-day median ALOS. The fact that the median has decreased means that the 'typical' inmate is being released on day 3 of their stay. The mean appears to have stayed at the 23.4 day level (it is actually a few hundredths of a day higher) by releases of longer staying inmates while the general tendency points to somewhat shorter stays. The next several tables examine differences in ALOS across demographic measures. The table below examines ALOS by gender. The 2016 results are provided for some context.

Table 20: Overall ALOS – All Inmates By Gender

	2018 Report		2016 Report	
	Mean	**Median**	**Mean**	**Median**
Males	25.9	4	25.6	4
Females	14.6	3	15.4	3
Total	23.4	3	23.4	4

Table 20 showed that the male ALOS has increased slightly in terms of the mean, while the female ALOS has decreased by 5%. Table 21 takes the ALOS data by race. Median ALOS decreased for black inmates yet the mean increased by half a day. Given the nature of means vs. medians, in this case the median is probably a better indicator of what the 'typical' inmate would face. Half of the inmate population is out on day 3 and for black inmates, half the population is out on day 4.

Table 21: Overall ALOS – All Inmates By Race

	2018 Report		2016 Report	
	Mean	**Median**	**Mean**	**Median**
Black	28.1	4	27.6	5
White	20.3	3	21	3
Other	20.3	3	19.8	3
Total	23.4	3	23.4	4

Table 22 below presents the overall ALOS by Hispanic ethnicity, a calculation not performed in 2016. The mean ALOS is relatively close to the overall ALOS, and the median ALOS is identical.

Table 22: Overall ALOS – All Inmates By Hispanic Ethnicity

	Mean	Median
Hispanic	24.1	3
Non-Hispanic	23.3	3
Total	23.4	3

We see some differences when inmate ALOS is divided by age group (Table 23). The medians are generally 3, except in a few instances. What is important to note is that the decreasing proportion of inmates below 25 years of age has an impact on the population. Inmates below 20 years of age have a significantly shorter ALOS in the Dane County Jail. However, the cohort of inmates between 20 and 25 years of age has a higher ALOS. This cohort is also decreasing proportionally in the population. Meanwhile, at the upper end of the age distribution, somewhat shorter ALOS numbers exist.

Table 23: ALOS By Age Group

	Mean	Median
Below 20	19.7	3
20 - 24.9	24.3	3
25 - 29.9	24.0	3
30 - 34.9	24.9	4
35 - 39.9	23.4	3
40 - 44.9	25.1	3
45 - 49.9	22.1	3
50 - 54.9	22.5	4
55 - 59.9	21.7	4
60+	17.0	3
Total	23.4	3

As implied previously when examining the differences between the number of bookings and the number in the ADP by most serious charge, there are important differences in ALOS across charge categories. As can be seen in Table 24, certain charge categories have more significant ALOS numbers. In addition, there are noteworthy variations between mean and median numbers as well. Finally, it should be noted that the table is sorted by the proportion of ADP in each group. As noted in the 2016 report, the biggest finding in this table is the ALOS for burglaries—a median of 10 days, which is much higher than other categories. The reason appears to be that these sentences are more frequently served in the jail, thereby increasing the ALOS for this category.

Table 24: ALOS By Most Serious Charge

Category	Mean	Median
Violent	43.1	4
Supervision Violation	17.8	6
Drug	22.7	3
Theft/Fraud	27.9	4
DUI	20.7	2
Other	19.9	7
Public Order	10.6	2
Burglary	62.0	10
Sex Offense	47.1	5
Weapon	43.2	4
Domestic Violence	6.7	1
Traffic	6.9	1
Total	23.4	3

Not surprisingly, there are gender differences in terms of ALOS. In every single instance, males have higher mean lengths of stay. In fact, the ALOS for males is 77.4% greater than for females. The lone exception is in the sex offense category where the very small sample size of 3 females resulted in a median length of stay of 21 days.

Table 25: ALOS By Most Serious Charge & Gender

	Females		Males		Total	
	Mean	Median	Mean	Median	Mean	Median
Violent	18.8	3	49.4	4	43.1	4
Public Order	6.7	2	11.7	3	10.6	2
DUI	15.4	2	22.1	2	20.7	2
Supervision Violation	16.5	6	18.1	6	17.8	6
Drug	16.3	3	24.9	3	22.7	3
Theft/Fraud	21.6	3	31.4	4	27.9	4
Domestic Violence	3.6	1	7.9	1	6.7	1
Other	12.3	5	20.9	7	19.9	7
Weapon	42.9	3	43.2	4	43.2	4
Traffic	4.3	1	7.7	2	6.9	1
Burglary	35.6	5	65.6	12	62.0	10
Sex Offense	46.3	21	47.1	5	47.1	5
Total	14.6	3	25.9	4	23.4	3

Table 26 contains the mean and median ALOS by race and most serious charge for the Dane County Jail between 2016 and 2018. As expected, differences are significant, particularly the ALOS for black inmates held on violent charges. The median average, arguably a much better indicator of the central tendency of the LOS data, is 2 days longer for black inmates. Similarly, there is a 17.3 day difference in the mean for weapons charges between black and white inmates. Black inmates also stay a week longer in mean average

terms with DUI and drug charges. White inmates have longer mean lengths of stay in 4 categories, with one of those being a very small difference in supervision violations. Whites have a higher median LOS in only theft/fraud cases.

Table 26: ALOS By Most Serious Charge & Race

	Black		White		Other		Total	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Violent	54.8	5	32.4	3	34.3	3	43.1	4
Supervision Violation	17.8	6	17.9	6	14.7	5	17.8	6
Drug	27.7	4	20.8	3	17.3	3	22.7	3
Theft/Fraud	24.4	3	30.3	4	29.6	3	27.9	4
DUI	27.6	3	19.0	2	16.2	2	20.7	2
Other	17.7	7	21.3	6	32.1	7	19.9	7
Public Order	13.4	3	8.4	2	8.8	3	10.6	2
Burglary	63.6	11	62.0	11	42.2	3.5	62.0	10
Weapon	50.2	4	32.9	3	25.8	2	43.2	4
Domestic Violence	9.3	2	5.1	1	9.2	1	6.7	1
Sex Offense	68.2	12.5	40.8	5	5.6	3	47.1	5
Traffic	4.3	1.5	8.8	1	4.6	2	6.9	1
Total	28.1	4	20.3	3	20.3	3	23.4	3

As we noted in 2016, there are a variety of possible explanations for these observed differences, several of which are societal and economic in nature. Regardless of the root cause, the differences are persistent and should be monitored by criminal justice stakeholders. Meanwhile, the chart below visually depicts the differences among the races in terms of median ALOS.

Figure 9: Inmates By Most Serious Charge Category, Race, and Median ALOS
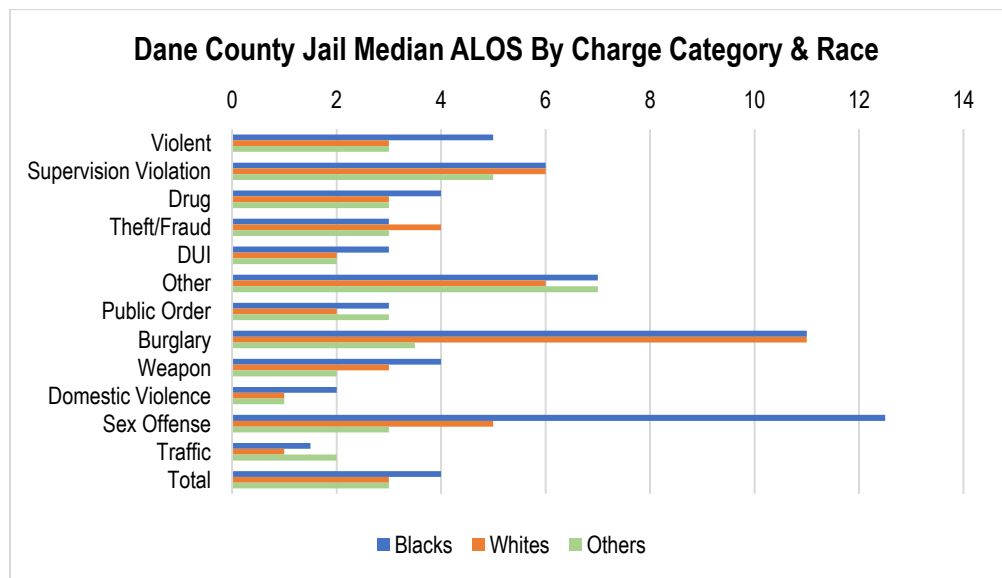
Probation & Parole Violators

Individuals who violate the terms of their conditional release present significant challenges to jail population management. The number of individuals in the Dane County Jail in connection with some form of supervision violation is increasing such that this type of inmate is now the second-most prevalent in custody. In addition, probation and parole violators typically have much longer lengths of stay, which has a significant impact on the jail's population over time.

All Inmates With A Supervision Violation Charge

As can be seen in Table 27, 10,860 bookings in the nearly 3 years of data in this study are for probation, parole and other forms of supervision violations. The ALOS is almost twice as high on a mean average basis, while the median is 3 times as high. The table below gives an ADP number that is significantly higher than what was seen earlier in the report because this table is not limited to counting people who only have a supervision violation as their most serious charge. Instead, this table counts everyone who has some form of a supervision violation including new criminal charges. Note also that the gender breakdown is fairly consistent to the population as a whole. On an average daily basis, the 437 inmates facing this type of charge constitute 57% of the population.

Table 27: Dane County Jail Supervision Violation Statistics By Gender

	Bookings	Mean ALOS	Median ALOS	ADP	%
Males	8,905	47.3	11	376.1	86.1%
Females	1,955	35.2	8	60.9	13.9%
Total	10,860	45.1	10	437.0	100.0%

Black inmates in the Dane County Jail who have at least one supervision violation stay longer than white inmates. Despite the fact that there are 1,000 fewer supervision violation bookings for blacks being booked into the jail, there are actually more black inmates in the Dane County Jail with at least one of these charges.

Table 28: Dane County Jail Supervision Violation Statistics By Race

	Bookings	Mean ALOS	Median ALOS	ADP	%
Black	4,822	50.6	12	217.6	49.8%
White	5,822	40.7	9	211.5	48.4%
Other	216	43	8	7.9	1.8%
Total	10,860	45.1	10	437.0	100.0%

The same statistics are presented by Hispanic ethnicity in Table 29, below.

Table 29: Dane County Jail Supervision Violation Statistics By Hispanic Ethnicity

	Bookings	Mean ALOS	Median ALOS	ADP	%
Hispanic	475	49.0	10	21.1	4.8%
Non-Hispanic	10,385	44.9	10	415.9	95.2%
Total	10,860	45.1	10	437.0	100.0%

Table 30 reveals that the ALOS for inmates with at least one supervision violation charge decreases with age. This is likely caused by the mean being affected by longer staying inmates, given what the values of the median are. Again, to be clear, this part of the analysis is not limited to the 'most serious charge'. Instead, these are inmates who have at least one charge falling into this category.

Table 30: Dane County Jail Supervision Violation Statistics By Age Group

	Bookings	Mean ALOS	Median ALOS	ADP	%
Below 20	521	51.7	8	22.2	5.1%
20 - 24.9	2,021	49.0	10	86.7	19.9%
25 - 29.9	2,281	45.2	11	92.5	21.2%
30 - 34.9	1,736	45.8	10	71.3	16.3%
35 - 39.9	1,288	46.2	12	54.9	12.6%
40 - 44.9	791	44.9	11	31.6	7.2%
45 - 49.9	768	45.0	11	30.7	7.0%
50 - 54.9	667	38.0	10.0	22.8	5.2%
55 - 59.9	486	35.0	7	15.2	3.5%
60+	301	32.3	7	9.0	2.1%
Total	10,860	45.1	10	437.0	100.0%

Inmates With Only A Supervision Violation Charge
While the previous section dealt with all inmates who have at least 1 supervision violation charge, this part of the analysis concentrates on inmates who have only a supervision violation charge. In some jurisdictions, these 'VOP-Only' or 'PV-Only' inmates can be a bellwether statistic for determining case processing efficiency. For our purposes, we examine the overall LOS statistics and its impact on the jail's population. On an average daily basis, there are 78 inmates who have only a supervision violation charge. There are no other charges holding these inmates. Note in the table below that there are a higher than expected proportion of females in this group. This appears to be because the ALOS is almost identical between males and females who only have a supervision violation charge. In addition, the ALOS of 15.5 days compares favorably to other jurisdictions as the Wisconsin Department of Corrections does have a streamlined process for managing

supervision violation cases. Indeed, in many jurisdictions across the country, the average time to have a first hearing for similar violations often exceeds the 15.5 day number. That said, more than 10% of the average daily jail population are being incarcerated for a supervision violation.

Table 31: Dane County Jail Supervision Violation Only Statistics By Gender

	Bookings	Mean ALOS	Median ALOS	ADP	%
Males	4,195	15.5	5	63.9	81.7%
Females	973	15.6	5	14.3	18.3%
Total	5,168	15.5	5	78.1	100.0%

For inmates with only a supervision violation charge, black inmates actually have a lower length of stay than white inmates. Note that the average is consistent with the gender split above and because of the ALOS number, the resulting ADP of this type of population more closely mirrors the 55.6% of bookings constituted by whites.

Table 32: Dane County Jail Supervision Violation Only Statistics By Race

	Bookings	Mean ALOS	Median ALOS	ADP	%
Black	2,187	14.9	5	32.4	41.4%
White	2,877	16.2	5	44.7	57.2%
Other	104	10.9	4	1.1	1.4%
Total	5,168	15.5	5	78.1	100.0%

Table 33 breaks out the supervision violation-only statistics by Hispanic Ethnicity. Note the identical median stays and the relatively comparable mean ALOS.

Table 33: Jail Supervision Violation Only Statistics By Hispanic Ethnicity

	Bookings	Mean ALOS	Median ALOS	ADP	%
Hispanic	206	16.3	5	3.1	4.0%
Non-Hispanic	4,962	15.5	5	75	96.0%
Total	5,168	15.5	5	78.1	100.0%

Meanwhile, the table below cuts the supervision violation only population by age group. It is here that we note a lower mean ALOS for inmates under 25. It appears that, for individuals who have a supervision violation charge in addition to another charge, the presence of the violation presents a complicating factor that increases ALOS for new offenses. In the case of people who are held only because of a violation, we see that the

averages are relatively consistent, as evidenced by the median being 5 days almost without exception.

Table 34: Dane County Jail Supervision Violation Only Statistics By Age Group

	Bookings	Mean ALOS	Median ALOS	ADP	%
Below 20	212	12.7	4	2.7	3.5%
20 - 24.9	893	13.6	5	11.4	14.6%
25 - 29.9	1,086	15.5	5	16.2	20.7%
30 - 34.9	810	17.6	5	14.0	17.9%
35 - 39.9	626	18.9	5	11.4	14.6%
40 - 44.9	370	13.5	5	5.1	6.5%
45 - 49.9	378	17.4	5	6.6	8.4%
50 - 54.9	331	16.0	5	5.5	7.0%
55 - 59.9	275	11.2	5	3.0	3.9%
60+	187	12.9	5	2.4	3.0%
Total	5,168	15.5	5	78.1	100.0%

Dane County Inmate Base Forecast Analysis

Population Dynamics Overview

In general, the best predictors of a jail's future population boil down to three factors: the previous population trend, the admissions into the jail, and the average length of stay for the jail's inmates. Before going into the forecasts themselves, these three factors are analyzed in turn.

As we noted in the 2016 report, the number of inmates incarcerated in the Dane County Jail facilities is largely seasonal in nature. The population rises in warmer weather months and recedes during Winter. The peak population day for 2018 (so far) occurred on September 10th and in 2017 the peak day was in late August. On the other hand, December and January are typically the months with the lowest average daily population. In fact, over the last 9 years, the lowest ADP number has occurred in those months 7 times. This seasonal variation is relatively common for larger jails, but it is especially pronounced and reliable in Dane County. In addition, the jail's population does not show much of a trend, something quite evident in Figure 10. Other than the seasonal variations, the overall population revolves around a mean of approximately 760 inmates for the last 7 years.

Figure 10: Dane County Jail Under Roof ADP
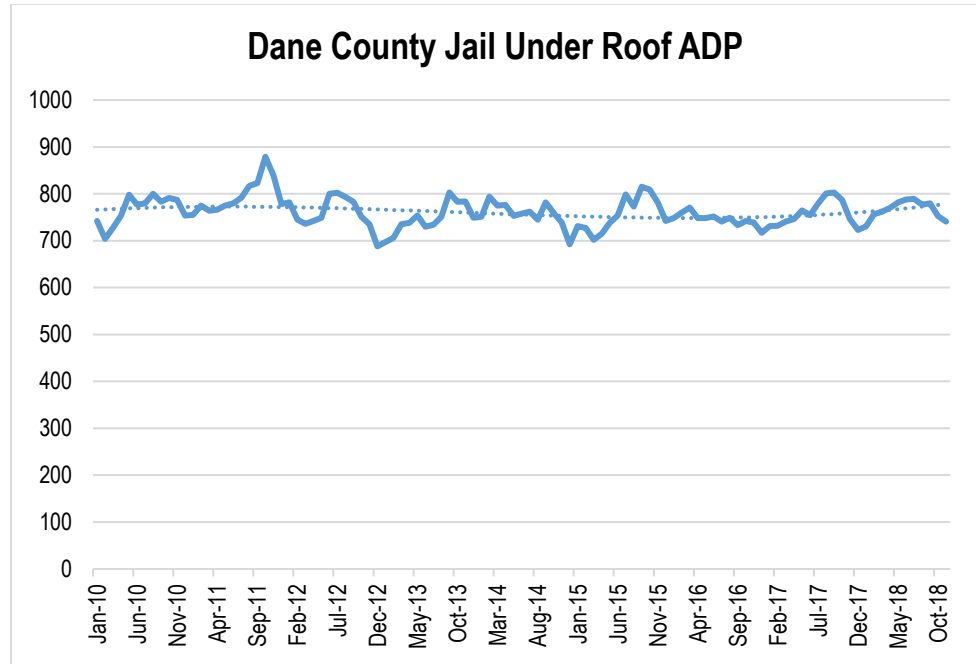

Dane County Jail Under Roof ADP

Figure 11 below presents the same data, but the bottom of the vertical scale is changed to 600 inmates so that the seasonal variation is more evident. The seasonal ebbs and flows of the jail's population are an essential ingredient for building accurate forecast models.

**Figure 11: Dane County Jail Under Roof ADP**

Dane County Jail Under Roof ADP
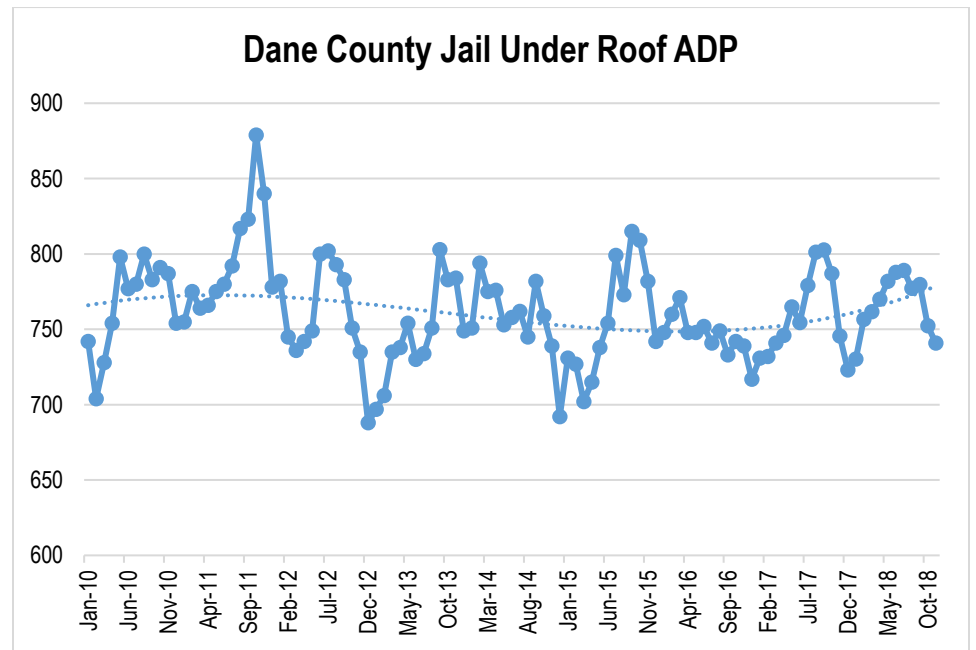
Meanwhile, we see differing trends for the two drivers of jail population, bookings and Average Length of Stay (ALOS). As the chart below indicates, bookings continue to decline at a small rate. On an average daily basis, the first 10 months of bookings in 2018 are lower than the same period of 2017 by 1.3 bookings per day. Note also that bookings are seasonal, with lower levels in December and January and higher levels during warmer months.

Figure 12: Dane County Jail Bookings
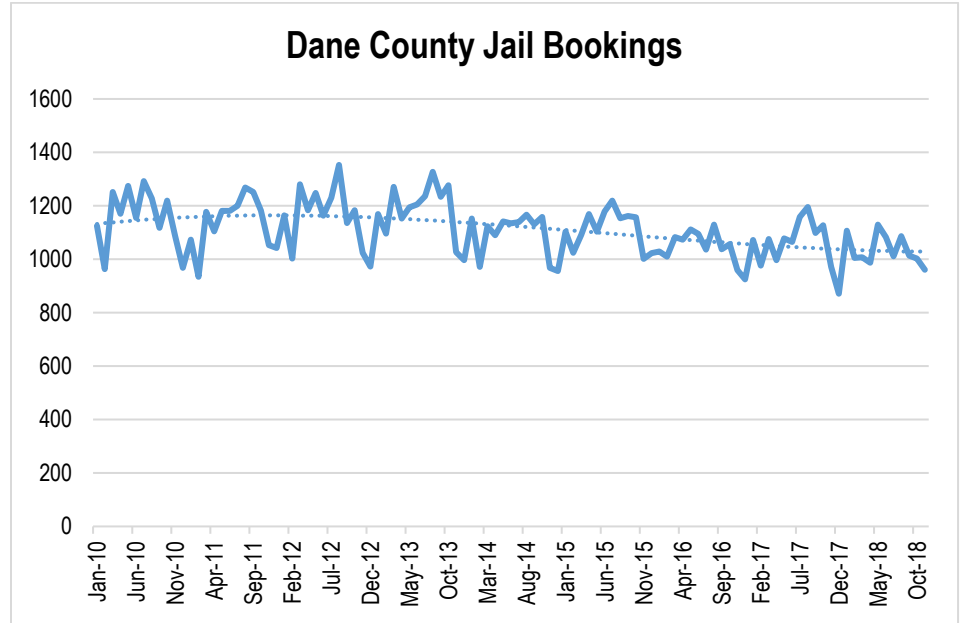
The chart below changes the bottom of the vertical axis to 800 bookings in order to highlight the seasonal variations in the trend. The thin dotted line is a trend line that assists with visualizing the central history of monthly bookings. Keep in mind that while the decrease since 2013 appears impressive on this chart, the previous chart provides a more realistic perspective.

Figure 13: Dane County Jail Bookings With Different Vertical Scale

Dane County Jail Bookings
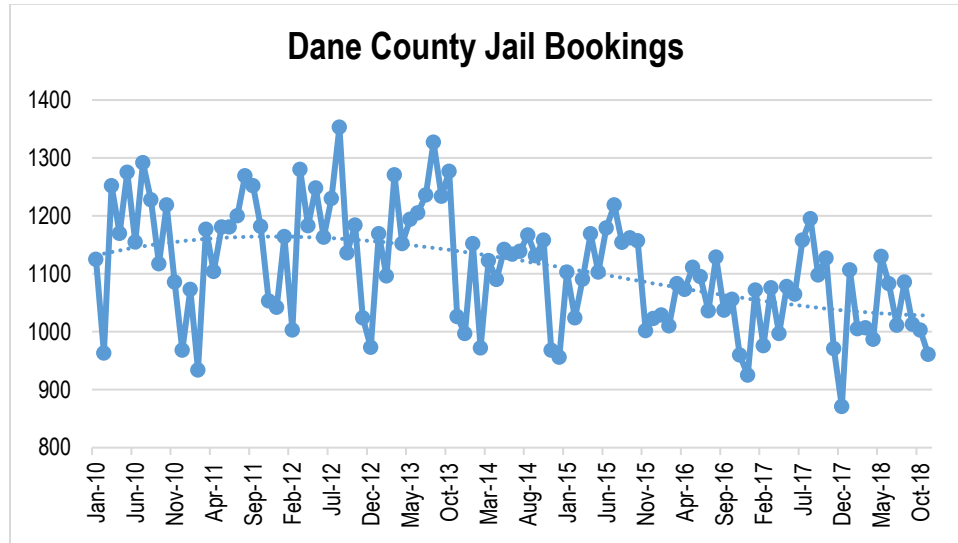
Meanwhile, the jail's ALOS is increasing, also at a small but constant rate. While the bookings trend reflects a decrease, we see a small increase in the average length of stay over time. The increase in ALOS is tending to offset the decrease in bookings, resulting in a fairly stable population. The chart below shows the monthly ALOS from 2010 to 2018. Although it is not as clear in the other measures, ALOS is also a seasonal number. Typically the highest ALOS during a year is in November/December, and the lowest ALOS tends to occur during August.

Figure 14: Dane County Jail ALOS

Dane County Jail Average Length of Stay
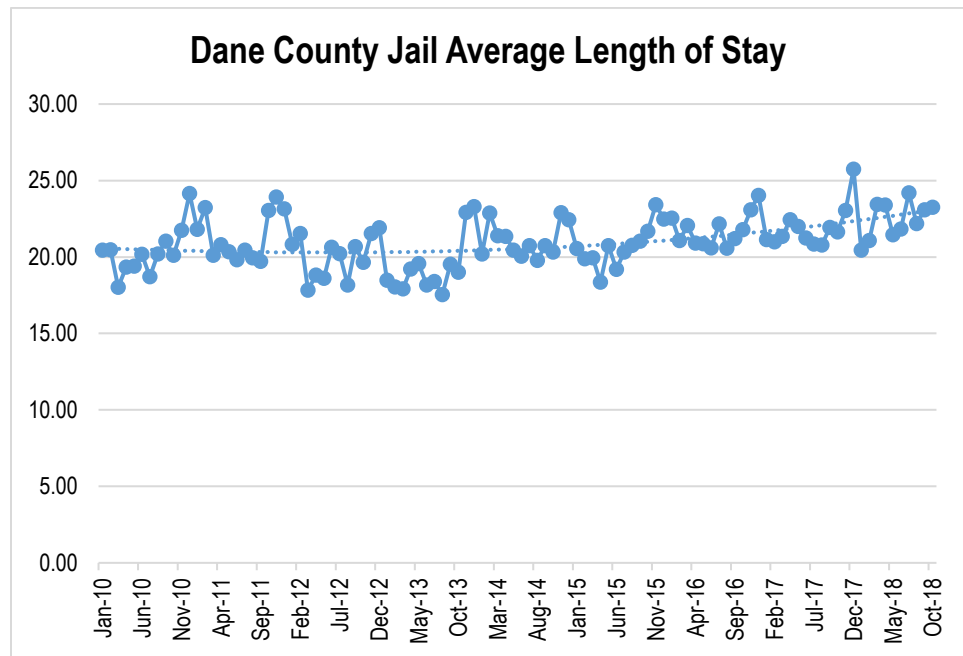
The decline in bookings is being slightly defeated by the increase in ALOS such that the jail experienced a very slight amount of growth in 2017 (1.8%) and again in 2018 (less than 1% if only the first 10 months of each year are compared). The table below summarizes the jail population, bookings and ALOS from 2010 to the end of October 2018. Keep in mind that the numbers for 2018 below represent only the first 11 months of the year. This is important because bookings tend to decrease at the end of the year and ALOS increases. To be clear, when we compare the first 11 months of 2018 to the same period of 2017, we see that ALOS has increased by nearly a day and bookings are down by a little more than 1 per day.

Table 35: Dane County Jail ADP, Bookings, & ALOS, 2010 - 2018

			Bookings				
	ADP	Change	Total	Daily Avg	Change	ALOS	Change
2010	767.0		14,155	38.8		19.8	
2011	793.0	3.4%	13,893	38.1	-1.9%	20.8	5.1%
2012	759.0	-4.3%	13,941	38.1	0.1%	19.9	-4.3%
2013	747.0	-1.6%	14,184	38.9	2.0%	19.2	-3.5%
2014	757.2	1.4%	13,132	36.0	-7.4%	21.0	9.4%
2015	757.0	0.0%	13,401	36.7	2.0%	20.6	-1.9%
2016	745.6	-1.5%	12,544	34.3	-6.7%	23.7	15.0%
2017	759.3	1.8%	12,684	34.8	1.4%	23.2	-2.3%
2018 (YTD)	766.2	0.9%	11,393	34.1	-1.8%	23.2	0.2%

Population Forecasting

Jail population forecasting is particularly vulnerable to changes which may occur in the criminal justice system or in the public policy arena as a whole. The best a forecaster can do at the time of issuing a population projection is to try to anticipate possible changes to a system and then statistically account for them. As we wrote in our 2016 report, "Forecasts of any type are only as good as what is known when the forecast was produced, combined with a relative absence of major events after that production. Any forecast assumes that what was known about the status quo at the time the forecast is produced remains in place for the duration of the forecast."

Our 2016 forecast of the Dane County Jail's 'under roof' population came about from testing a large number of mathematical models using Autoregressive Integrated Moving Average (ARIMA) time series methodology. This methodology allows the researcher to control possible error terms in a trend while enabling the inclusion of predictor variables. In short, the ARIMA methodology which is an approach that statistically evaluates a given trend and diagnoses important aspects of the trend. Doing this then enables the researcher to develop accurate forecast models. The best performing model (diagnostically speaking) in the 2016 analysis used the past history of the jail's population to predict the future. Statistically speaking, the model performed the best of all of the models examined. Other

models that we tested in 2016 employed bookings, ALOS, and the overall Dane County population projections as variables, but they were not as strong as the selected model.

2016 Forecast Evaluation

The 2016 model has performed fairly well in the past 2 years. The forecast was built in March/April of 2016 and since that time, the forecast has been within the actual daily population by 0.9%. In fact, for 2018, the forecast has only been 0.3% off of the actual population. As Figure 14 below shows, the forecast and the jail's ADP have followed similar patterns, with some months being exactly the same. However, it should be noted that the forecast has not seemed to fully predict the seasonal peaks and valleys of the population. Even so, the highest monthly deviation from the population is less than 5%. The 2 figures which follow show the forecast and ADP trends. Figure 15 shows how well the forecast model fits the data from 2010 through the end of November 2016 while Figure 16 zooms in the scale and looks mainly at the time period since the forecast was produced.

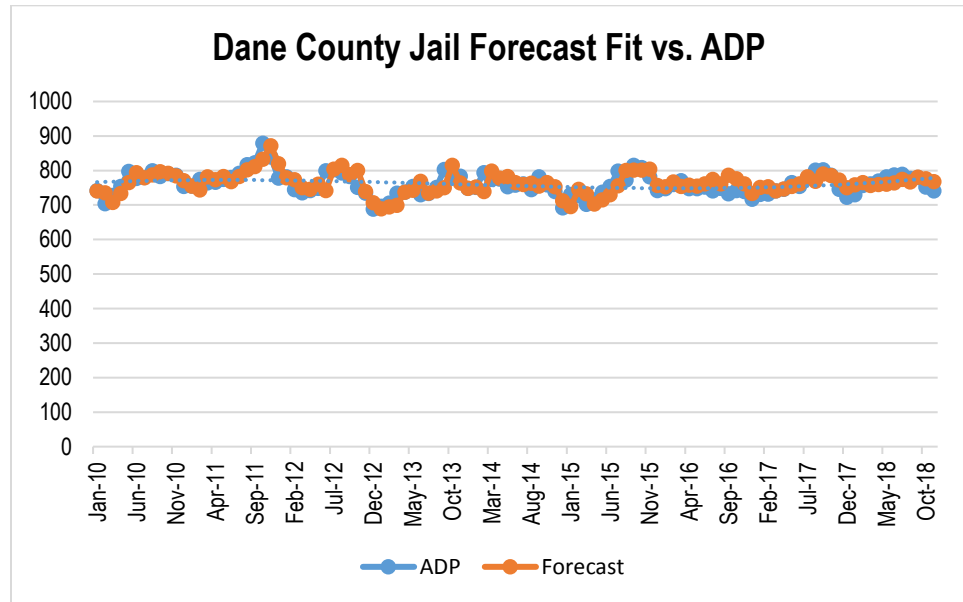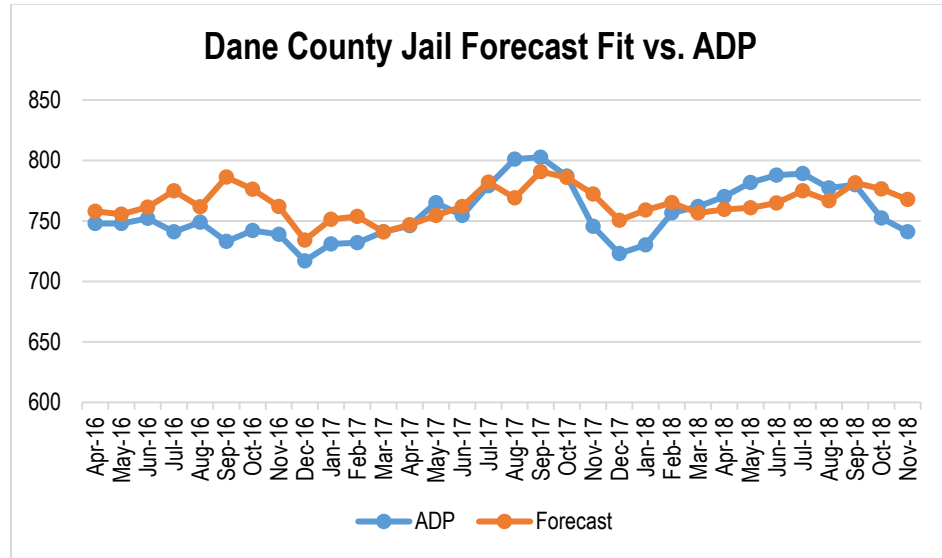**Figure 15: Dane County Jail 2016 Forecast vs ADP**

Figure 16: Dane County Jail 2016 Forecast vs ADP

Dane County Jail Forecast Fit vs. ADP

2018 Forecasts

Since the 2016 forecast was produced, there have been significant advances in statistical software. The biggest advance is that it is now much easier to conduct simulation modeling of hundreds of possible ARIMA and other forecast models. Thus, using the same general approach, but a more advanced set of methods, the 2018 forecast model was produced. Out of the hundreds of models tested, 5 models performed very well in terms of their statistical diagnostic tests. In fact, one of these models was the same one used for the 2016 forecast. However, the best performing of the 5 final models was an ARIMA model which concentrated specifically on the Dane County Jail population's seasonal peaks and valleys. This forecast model is based solely on the prior trend of the jail's population and is almost identical to the long term guidance of the 2016 model. The charts below compare the 2016 and 2018 ARIMA forecasts. Note that the 2018 forecast model is able to sustain the seasonal variations in the population throughout the forecast period.

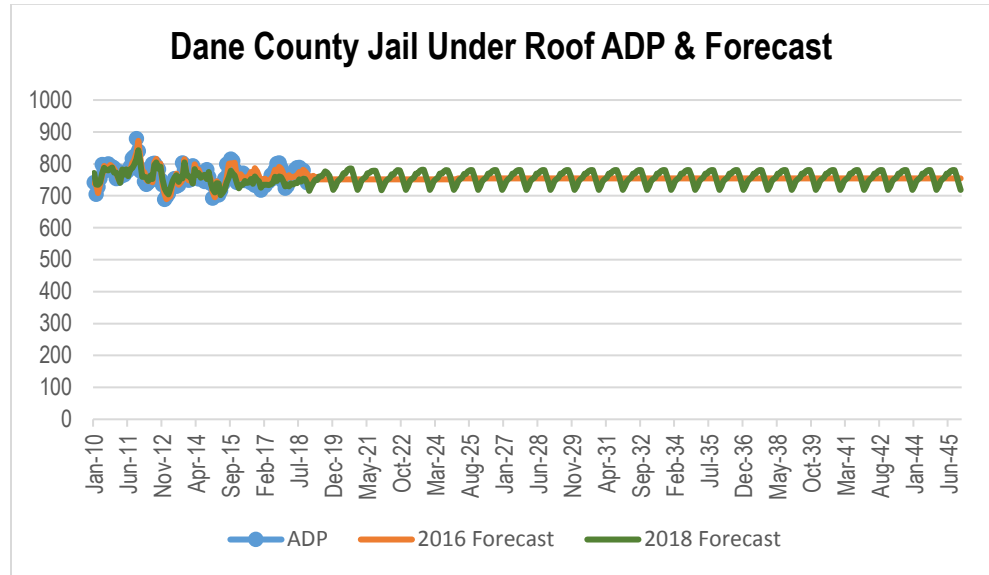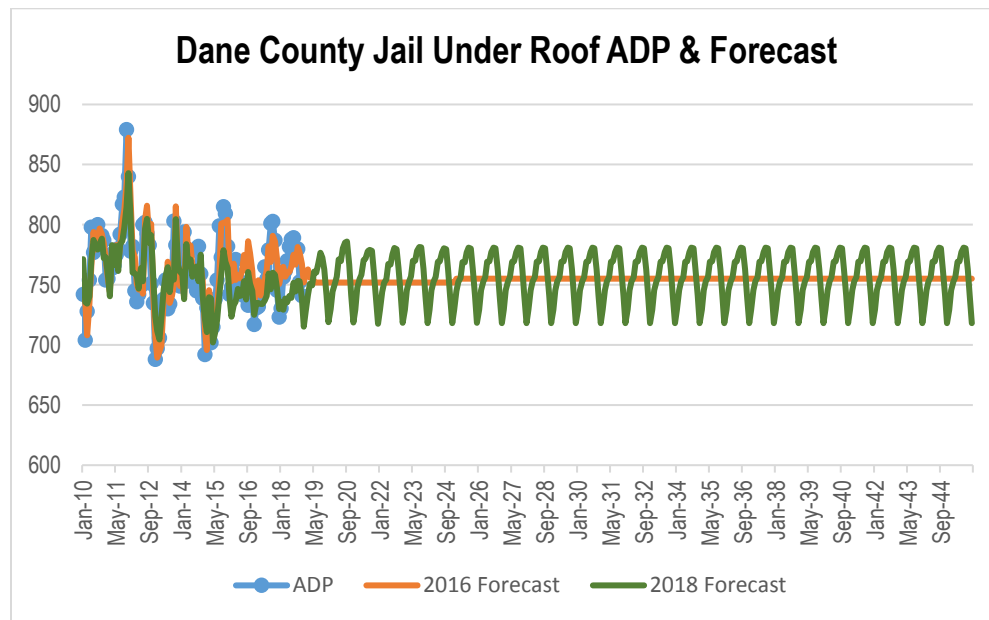**Figure 17: Dane County Jail Forecasts, 2018 vs. 2016**

Figure 18: Dane County Jail Forecast Using Higher Minimum Scale

The table below compares the 2016 and 2018 forecasts over time. Both forecasts hold steady, with the net result being a very small increase in the projected population. The 2018 forecast was assembled in mid-November 2018 and predicted a November 2018 ADP of 745, 4 more than the actual ADP of 741 for November. The 2016 forecast missed the November 2018 population by 26 inmates.

Table 36: Dane County Forecast Comparison Through 2045

Month	2016 Forecast	2018 Forecast
Jul-21	753	778
Jul-25	751	777
Jul-29	755	777
Jul-33	755	777
Jul-37	755	777
Jul-41	755	777
Jul-45	755	777

The 'next best' model included bookings, ALOS, and the county's projected population as predictor variables, resulting in a slightly higher population projection (20 inmates for a year 2045 number of 797 inmates). The shape of the time series was identical to the selected 2018 forecast.

As implied previously, these forecasts are predicated on the assumption that the basic levels of bookings and ALOS continue to remain stable. Dane County has been very effective and fortunate in this regard. In fact, the booking and ALOS forecasts that were constructed as part of this project call for these trends to continue into the future. It was impossible to construct a logical 'what if' ARIMA model that called for an increase in bookings and ALOS given the prior history of this trend.

It should therefore go without saying that an increase in bookings and ALOS would result in an increase in ADP. To demonstrate what could happen, Table 37 lists 4 hypothetical scenarios for consideration. The first row shows the current statistics resulting in a year to date ADP of 766.2 inmates. The second and third rows increase the ALOS while keeping bookings the same. The bottom rows manipulate bookings back to the daily levels experienced just 3 years ago.

Table 37: Dane County Forecast Scenarios

Scenario	ALOS	Daily Bookings	Resulting ADP
2018 YTD	23.2	34.1	766.2
ALOS Increase to 24 Days	24.0	34.1	791
ALOS Increase to 24.5 Days	24.5	34.1	808
2018 ALOS, 2015 Booking Level	23.2	36.7	824
ALOS 24.5 Days, 2015 Booking Level	24.5	36.7	870

In addition to the ADP results of the forecast models themselves, it is important to examine the number of beds that are actually going to be required on a daily basis to operate a safe

and secure facility. The forecasts also enable us to anticipate and factor in the actual 'bed need' of the jail. In order for the jail to function effectively, there needs to be a population capacity cushion that allows jail managers to maintain classification rules as well as weather the impact of the noted seasonal population variations. Specifically, the various subcomponents of the jail's population expand and contract due to a variety of factors. Certain classification levels or populations of inmates grow in numbers in such a way that the jail needs to be able to be flexible with housing assignments. Therefore, bed need calculations take into account seasonal 'peaking' of populations as well as the fluctuations of classification groups within the jail's population. For the 2016 study, that factor was calculated at 20%, with 12% due to seasonal peaking and 8% due to variations in classification levels. An analysis of each day's population since the 2016 forecast was issued reveals that there is technically an 11% seasonal peak. Coupled with an 8% classification factor, we believe the factor is more accurately 19%. The table below relates the bed need of the Dane County Jail in light of peaking and classification requirements. The table also includes the bed need from the 2016 base forecast.

Table 38: Bed Need Calculations From Forecasts

Month	2018 Forecast	2018 Forecast With 19% Peaking & Classification	2016 Forecast	2016 Forecast With 20% Peaking & Classification
Jul-21	778	926	753	904
Jul-25	777	925	751	906
Jul-29	777	925	755	906
Jul-33	777	925	755	906
Jul-37	777	925	755	906
Jul-41	777	925	755	906
Jul-45	777	925	755	906

Conclusions

There are a variety of conclusions to take away from the present study. Dane County appears to be on the right track in terms of the jail's population. The population level is for the most part stable and predictable. The 2016 forecast has performed very well during the last 2 years. The new forecast will hopefully improve upon that performance and continue to be relevant and accurate for many years to come. Despite the relative success in keeping the jail's population stable, the fact remains that there are 21 more inmates on an average daily basis now than when the 2016 forecast was released. The jail's population has slightly increased in both 2017 and so far in 2018. This is a trend that should not be sustained in the long term.

Another key conclusion of this analysis is that the Dane County Jail houses a population which presents a variety of serious concerns. Evidence from the most serious charge category analysis indicates that proportionally more inmates have violent charges than in

the past. A significant number of inmates face felony charges. Many inmates are facing violations of the terms of their supervision for prior offenses and will stay in jail for longer periods of time.

Meanwhile, disparities in ALOS continue to exist in many of our analyses. Efforts to shrink the gulf between the races in terms of jail stays need to continue.

In terms of recommended future steps, the single most important statement that could be made is that every effort must be made to safeguard against an increase in ALOS. In the 2016 analysis, much emphasis was placed on attempting to identify further diversion opportunities. However, with an enhanced analysis, it is quite likely that the jail population as currently constituted contains little to no 'low hanging fruit' in terms of further diversion opportunity. The Sheriff's Office use of jail diversion programs continues to do an excellent job in this regard. When compared to a multitude of other jurisdictions across the country, the Dane County Jail incarceration rate per 100,000 residents of 199 continues to be lower both in terms of the total jail population as well as the pretrial segment of the population. Figure 19 compares the Dane County total and pretrial incarceration rates with the nation, Wisconsin, Milwaukee, and 7 other counties which have roughly the same number of residents.

Figure 19: Dane County Jail Incarceration Rate vs Other Jurisdictions
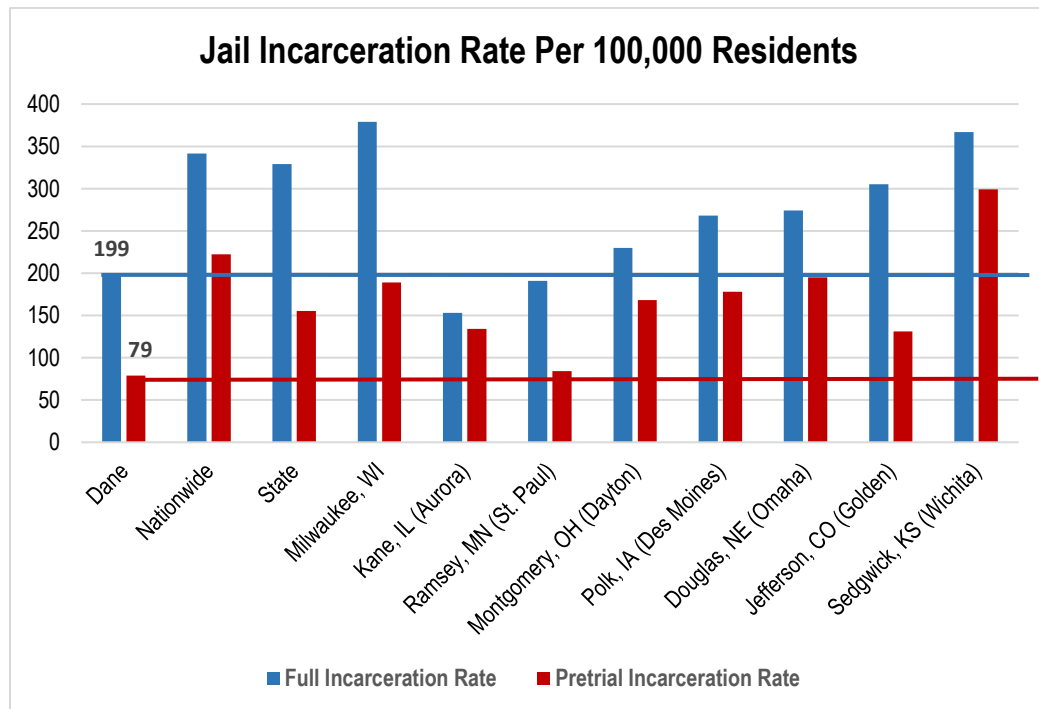
It is apparent that if there is a path to managing or reducing the jail's ALOS it would have to come through some form of faster case processing. Our analyses of the jail's data does

not speak to the actual case processing data. It may be likely that there is also little to no room for improvement in case processing times.

A second area for future consideration deals with information. There needs to be a set of statistics beyond counts that are automatically stored each day. For that matter, the days of hand-recording daily counts should be over given readily available technology. New reports should be designed which run on an automatic regular basis. The information from these reports should be automatically stored to feed useful facts to decision makers in the future. Some reports should help with jail population management and some reports should feed a daily data repository to facilitate monitoring of the components of the population. Such an approach would also facilitate a sorely needed adoption of a formal mental health rating system which could be used to track the mental health population over time. This information could then be used to capture trends in the acuity levels of this population. Such a solution could be structured to avoid the undercount represented by the institutional classification tracking method as well as possible questions about the psychotropic medication data. All of these methods have been successfully implemented in other jurisdictions and would assist Dane County in continuing to effectively manage the jail. We would hope that as the county moves forward with its jail expansion plan, these enhanced data recommendations will be implemented in a parallel track with the new construction.