Bethel Local Option Laws: Data Impact Report

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Recover Alaska

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Introduction

The Alaska State Legislature, through Local Option (Title 4 of the Alaska Statutes), provides a method for municipalities and established villages to impose limits on the sale, importation, and possession of alcohol. Regulation of alcohol sales is a critical health policy lever available to self-governing indigenous communities or groups; however, its impact on alcohol-related harms such as violent crime is inconclusive. Research on the impact of local option laws on crime in countries with self-governing indigenous populations such as the US, Canada, and Australia has produced inconsistent results, with some studies finding that abstinence-oriented regulations have had a beneficial effect on health and crime, and others reporting that disallowing alcohol importation and consumption can increase criminal activity such as bootlegging. (Muhunthan et al., 2017; Ogilvie, 2018)

Multiple Alaskan studies report that limiting the sale or consumption of alcohol in rural villages was associated with decreases in alcohol-related injury, assault, and motor vehicle accidents. (Berman et al., 2000; Berman, 2014; Chiu, Perez, & Parker, 1997; Wood & Gruenewald, 2006) These studies also found, however, that limiting alcohol sales and consumption was not associated with a reduction in rates of self-harm, which is a significant issue in rural Alaska where rates are far in excess of the national average. Some studies also demonstrated that reported reductions in alcohol-related crime were highly dependent on police presence. (Wood, 2002)

This project took advantage of the natural experiment related to changing local option laws and legal availability of alcoholic beverages in Bethel to investigate how these changes affected health and safety outcomes. Our goal was to determine whether there were changes in frequency of adverse health and safety outcomes such as police, fire, and state troopers calls for service or need for search and rescue in the Bethel area (a) following withdrawal from local option control of access to alcoholic beverages and (b) during the time the AC Quickstop liquor store was open.

This evaluation consisted of a secondary data analysis using de-identified counts of calls or incidents from the:

- Alaska State Troopers (AST).
- Bethel Fire Department (BFD),
- Bethel Police Department (BPD)
- Bethel Search and Rescue (BSAR)

De-identified health care utilization records (counts of emergency room visits, hospitalizations, hospital days) from the Yukon-Kuskokwim Health Corporation (YKHC); and screen-ins, substantiated allegations, and placements recorded by the Alaska Office of Children's Services (OCS) were also included in the evaluation. These data were used to compare service demand and utilization during the following time periods spanning twelve years from 2007 to 2018:

- Thirty-four months before the vote to remove Bethel from local option prohibition on sale of alcohol (January 2007 – October 2009)
- Six and a half years between vote to leave local option and opening of first liquor store (November 2009 – April 2016)
- Twenty-five months during which the AC Quickstop liquor store was open (May 2016 – May 2018)
- Seven months after the AC Quickstop liquor store closed (June 2018 – December 2018)

Background

After statehood in 1959, the Alaska Legislature adopted Title 4 of Alaska Statutes to regulate the sale and dispensing of alcohol throughout the state. (Alcohol and Marijuana Control Board, 2019; Hewitt and Nibeck, 2018) Title 4 empowers incorporated municipalities and unincorporated communities (established villages), to adopt one of five local options related to prohibition and sale of alcohol:

- Local Option 1: Prohibits sale; (allows importation and possession)
- Local Option 2: Prohibits sale, except by selected licenses
- Local Option 3: Prohibits sale, except on premises operated by the Municipality
- Local Option 4: Prohibits sale and importation
- Local Option 5: Prohibits sale, importation, and possession

Bethel voted to prohibit alcohol sales (Local Option 1) in 1977 and then rejected changes to the ban several times before voting to in 2009 to withdraw from the local option system. With the 2009 withdrawal from local option, the Alaska Alcohol Beverage Control Board could start issuing package store, restaurant, and other liquor licenses in Bethel and Bethel residents could order unlimited amounts of alcohol from package stores elsewhere in the state and have them delivered to Bethel through the state-monitored Bush order program.

Alaska Statutes allow for one package store license for each 3000 population or fraction of that population. The population estimate for Bethel in 2016 was 6378, making the city eligible for three licenses. The population estimate has now slipped just below 6000, reducing the maximum number of licenses to two.

AC Quickstop liquor store, owned by Alaska Commercial Company, opened in Bethel on May 24, 2016. It was the first liquor store to operate in Bethel since the city banned alcohol sales in 1977. The AC Quickstop continued in operation until May 22, 2018 when the Alaska Alcohol Beverage Control Board denied the store's application to renew its liquor license after hearing testimony at its meeting in Bethel. (United States Census Bureau, 2019)

Bethel Spirits, owned by Bethel Native Corporation, opened on September 29, 2016 and operated for 30 days in 2016 and 30 days in 2017. State regulations require that a liquor store operate at least 30 days a year to maintain the license. The store re-opened on July 10, 2018

but sold only Alaska-produced beer and wine. The store closed voluntarily on December 8, 2018 in preparation for transferring its license to Caribou Traders who opened their new liquor store on December 31, 2018.

Project Team

This project was conducted by the Institute for Circumpolar Health Studies at the University of Alaska Anchorage, in collaboration with the Alaska Native Tribal Health Consortium. The research team traveled to Bethel in May 2018 to consult with the Association of Village Council Presidents (AVCP), the Yukon-Kuskokwim Health Corporation (YKHC), and the Orutsararmiut Native Council (ONC) – the tribal entities that invited the University to conduct this study. The team also met with the Bethel Fire Department, the Bethel Police Department, the Alaska State Troopers, Bethel Search and Rescue, and YKHC emergency department, sobering center, and medical records staff to learn about what data might be available for this evaluation.

The Project PI (Dr. Johnston) also attended the AVCP Public Safety Summit in August 2018 and met with the Mayor, and representatives from YKHC, the Tundra Women's Coalition, and ONC during that trip.

The purpose of these visits was to explain the project, to learn more about what outcomes are of most interest to these communities and what data might be available, and to better understand the community context.

Methods

The research team met with the Alaska State Troopers (C Detachment, Bethel Post); the Bethel Fire Department, the Bethel Police Department, the Bethel Search and Rescue organization, and the Yukon-Kuskokwim Health Corporation to identify available data that could be used to for compare health and safety outcomes across the three time periods: two years prior to the 2009 local option vote, the time during which Bethel was not under local option but no there was no full service liquor store, and the time during which the liquor store was open.

In order to assess the effect of the local option vote and the opening and the closing of the liquor store on each of the various outcomes, we modeled the each set of counts, using negative binomial time series analysis with robust standard errors. For each model we considered four possible independent variables:

- Seasonality – indicator variables for each month
- Time trend – monthly time variable
- Vote – indicator variable set to 0 before the vote in October 2009 and set to 1 after

- Store – indicator variable set to 1 for months when the liquor store was open and 0 for all other months

Goodness of fit for each model was assessed by examining normality of residuals and comparing predicted outcomes to actual counts.

Data and Results

Bethel Fire Department, 2007 – 2018

Data

The Bethel Fire Department (BFD) provided monthly counts from January 2007 through December 2018 for:

- All BFD runs
- Runs noted as having alcohol involvement
- Runs related to assault
- Motor vehicle incidents
- Suicide attempts

Results

Figure 1 depicts the monthly counts for the entire study period, with arrows indicating when Bethel left local option and when the AC Liquor Store opened and closed. Visual examination shows the monthly count for total runs over time, peaking while the store was open and then dropping when the store closed. With less than a year of follow-up after the store closed, it is difficult to predict where the counts will settle after that transition.

Figure 2 depicts the monthly counts for the entire study period for alcohol-involved runs. The monthly counts for alcohol-involved calls are lower than for total runs but the pattern is very similar. Because alcohol involvement is not always detected or recorded, it is likely that alcohol-involved calls are undercounted. Therefore, we chose to focus our more detailed analysis on total runs rather than alcohol-involved runs.

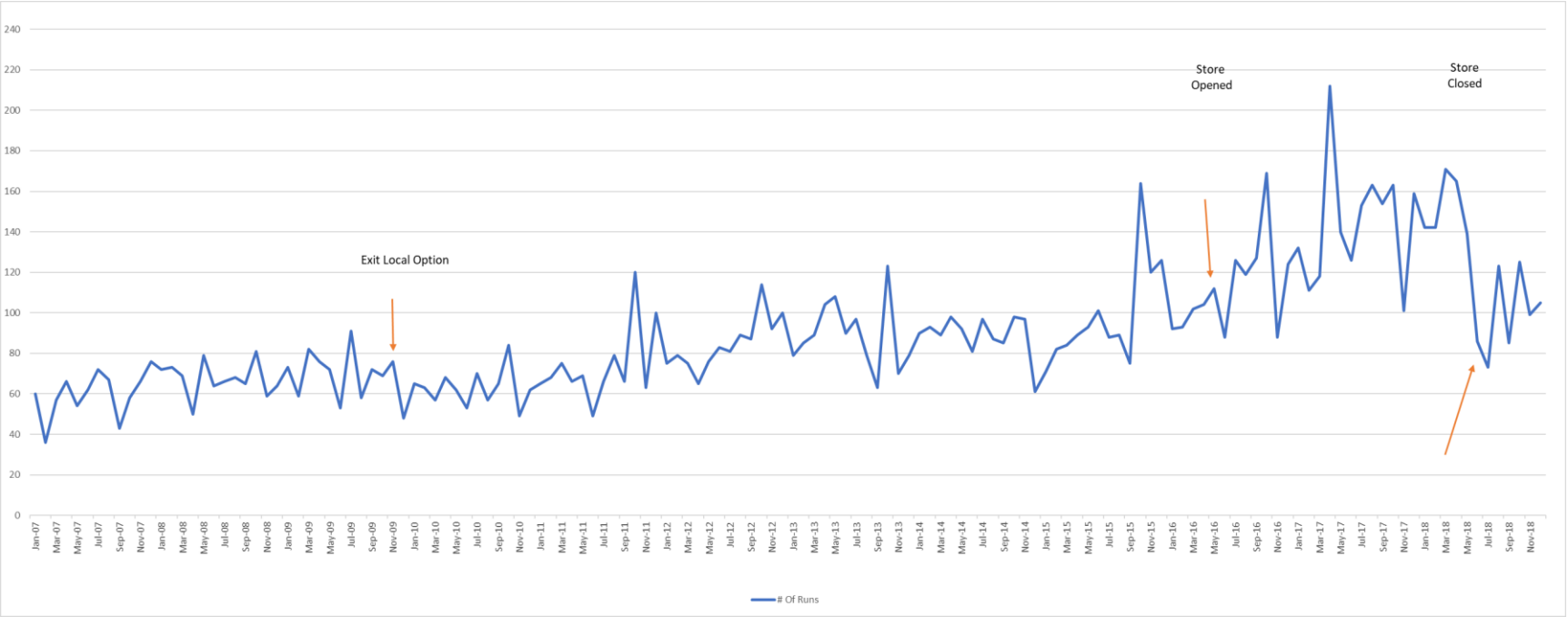


Figure 1 Total BFD Runs by month

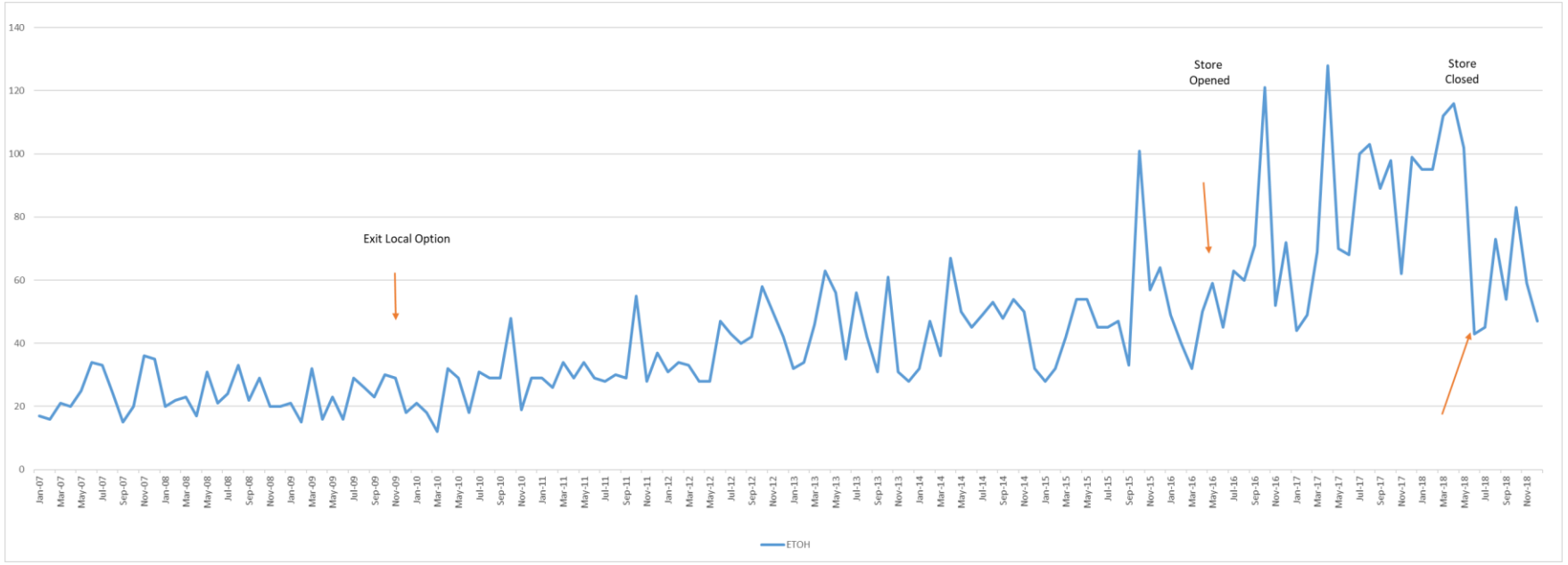


Figure 2 Alcohol-related Runs by month

In order to assess the effect of the local option vote and the opening and closing of the liquor store more rigorously, we modeled the total runs counts using negative binomial time series analysis with robust standard errors. After taking into consideration seasonality, we found a steady increase over time (0.8% increase per month, monthly beta coefficient = 0.008, p<0.001) plus an increase of approximately 42% during the time the store was open (store beta coefficient = 0.349, p<0.001). Figure 3 shows the predicted vs actual values for Total BFD runs from 2007 through 2018.

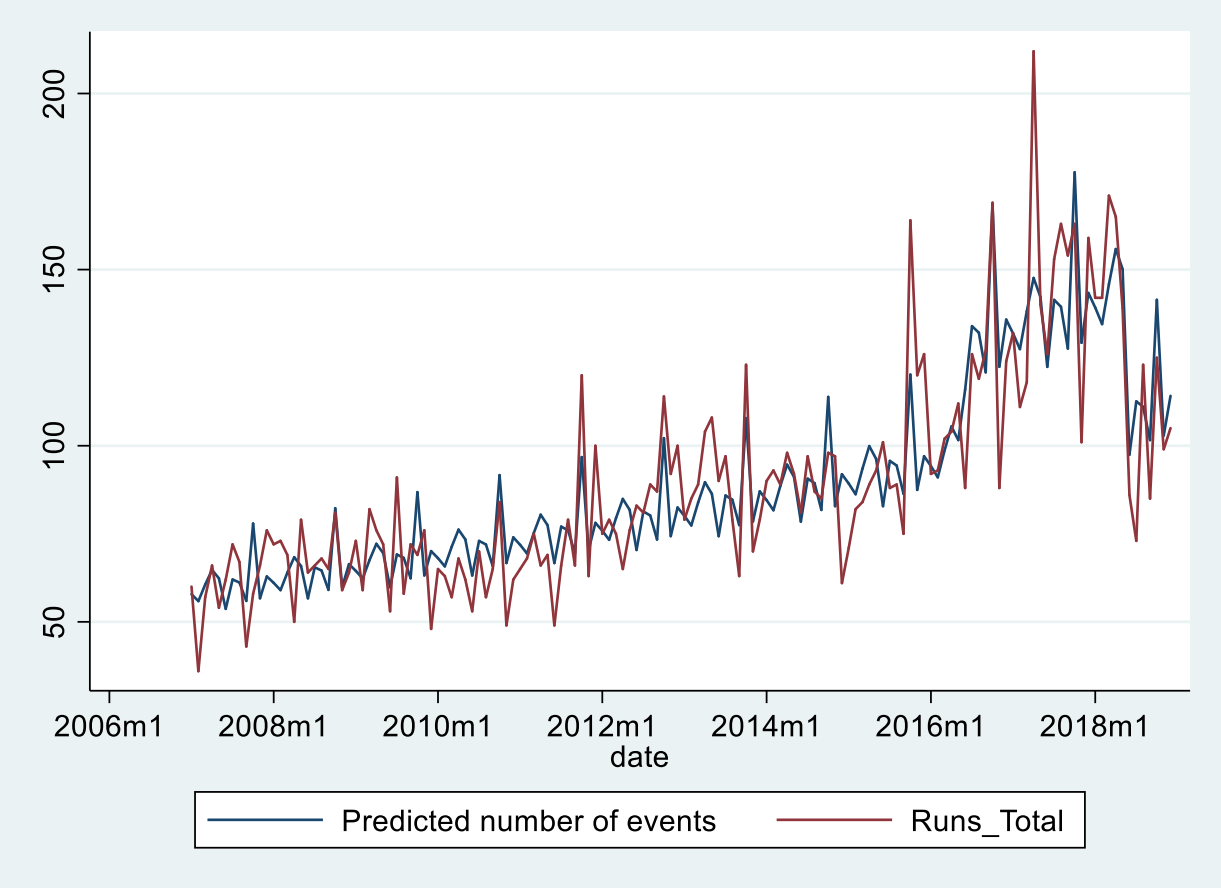


Figure 3 Predicted vs Actual, Total BFD Runs

Figure 4 depicts runs related to assaults for the entire study period and Figure 5 depicts motor vehicle incidents. The number of suicide attempts was too small to analyze. Visual inspection of the Assault data suggests little effect of exiting local option but an increase while the store was open. Given the small numbers of motor vehicle incidents, it is more difficult to detect trends visually.

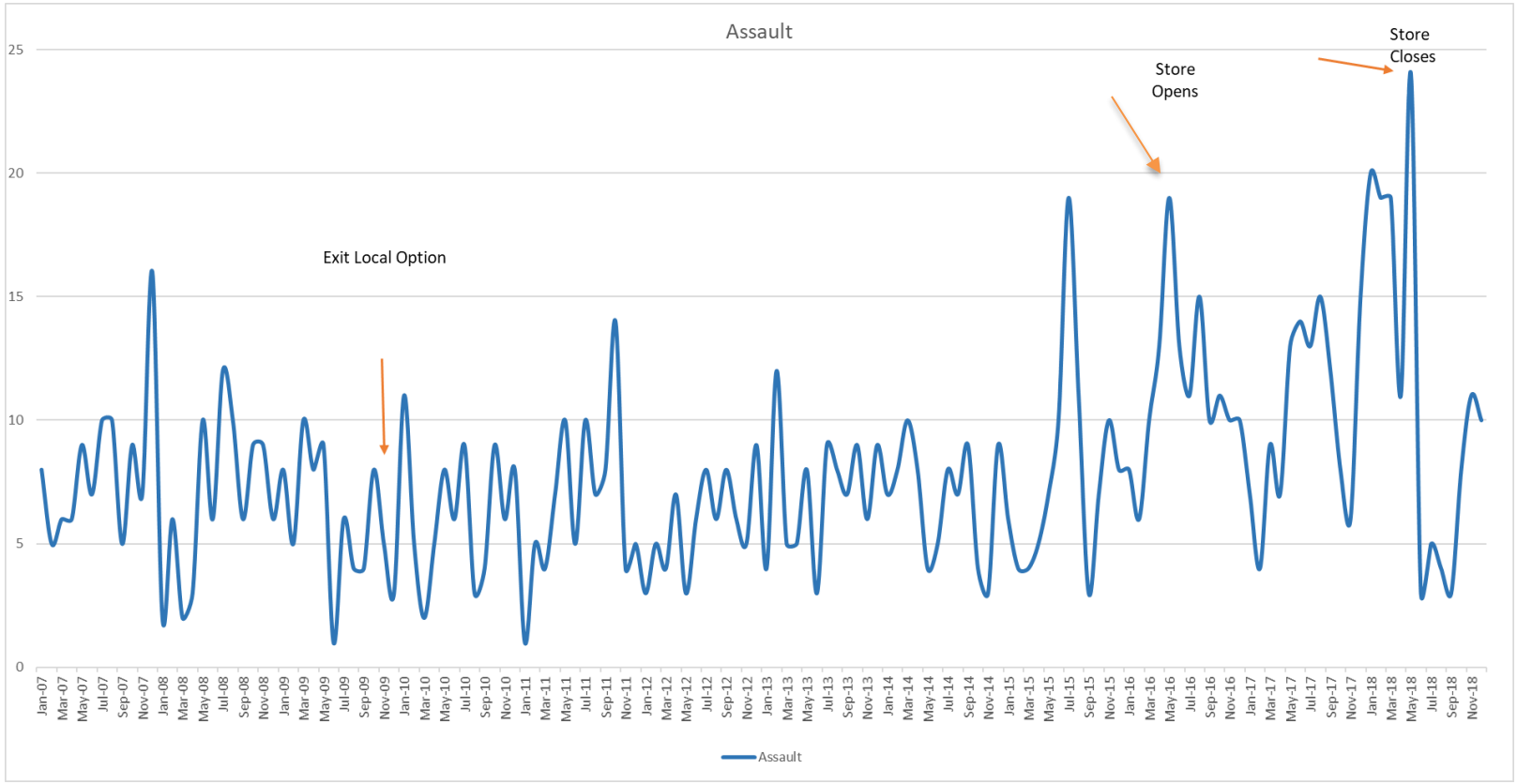


Figure 4 Runs Related to Assault by month

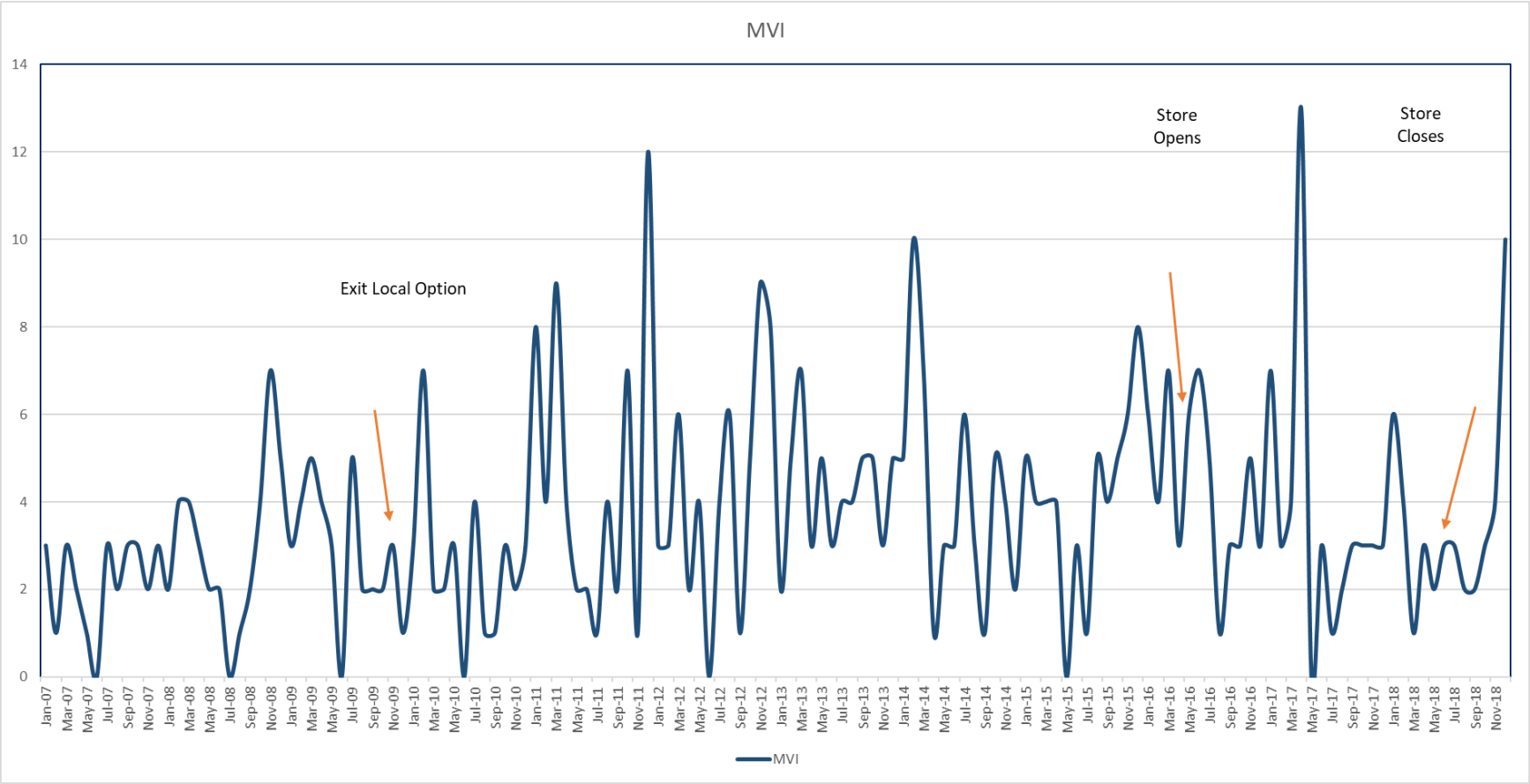


Figure 5 Motor Vehicle Incidents by month

According to the negative binomial time series, the assault-related runs did not show the same seasonality that was evident in the total runs. However, the best time series model did show a statistically significant increase of approximately 52% while the store was opened compared to while local option laws were in effect. This model also included a small monthly increase (0.35% increase per month, monthly beta coefficient = 0.0035, p=0.053) as well as a decrease following the local option law vote of approximately 22% (vote beta coefficient = -0.248, p = 0.070). Both of these coefficients were almost but not quite statistically significant at the 0.05 level. Figure 6 shows the predicted vs actual counts for assault-related runs. As you can see from the figure, the model over-estimates some of the counts while the store was open.

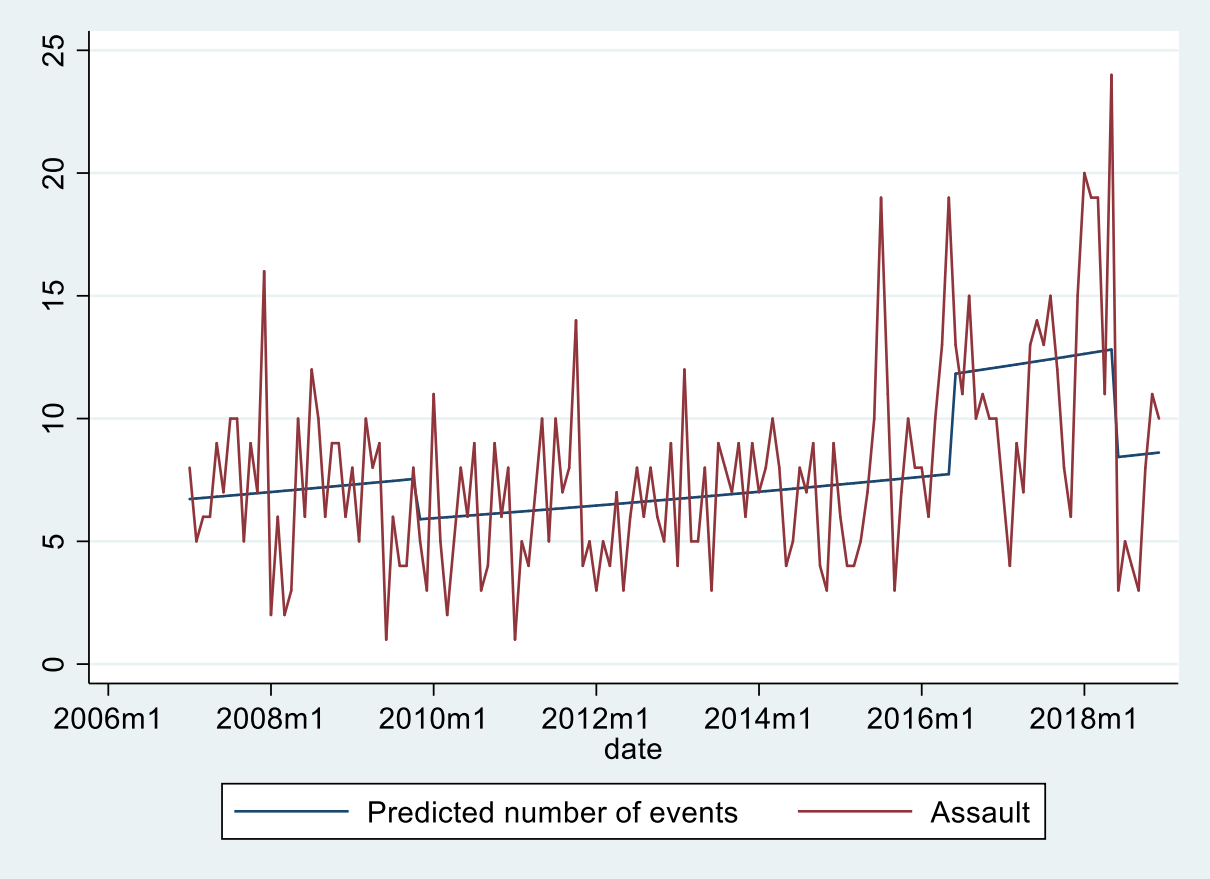


Figure 6 Actual vs Predicted Assault-related runs, by month

Time series analysis for motor vehicle incidents showed seasonality and a small, statistically significant increase by month over time (monthly increase = 0.33%, monthly beta coefficient = 0.0032, p = 0003); however, modeling did not detect changed related to the local option vote or the opening or closing of the liquor store.

BFD Summary

The Bethel Fire Department has seen an increase in the number of runs per month over time during the course of this study. In addition, however, the total run volume increased by approximately 40% while the liquor store was open, and the run volume appeared to drop when the store closed. Assault-related runs were also higher than expected while the store was open, although there was a suggestion that leaving local option was associated with lower than expected assault-related run counts. Frequency of motor vehicle incidents did not appear to be affected by either the local option vote or the opening or closing of the liquor store.

Bethel Police Department, 2010 – 2018

Data

The Bethel Police Department (BPD) provided monthly counts from January 2010 through November 2018 for police calls in the following categories:

- Crimes against people
- Crimes against property
- Death/Suicide
- Traffic
- Other offenses

BPD switched to a new reporting system in mid-January 2010. BPD reported needing some time to adjust to the new system and consider the later years as more reliable than the first couple of years. Data from January 2010 will be excluded from the analysis. Data from all years will be included in graphs, but regression analysis will be restricted to data from January 2012 through December 2018 in order to exclude the first two years with the new system.

Results

Between 2010 and 2018, 53% of calls were for intoxicated pedestrians and an additional 14% were disturbance calls. Figure 7 depicts the monthly counts for intoxicated pedestrians and disturbance calls from February 2010 through November 2018. Visual inspections suggests that the volume of Intoxicated Pedestrian calls increased gradually over time, reaching the highest levels while the liquor store was open. Disturbance calls were more constant over time, but still showed the highest levels while the liquor store was open.

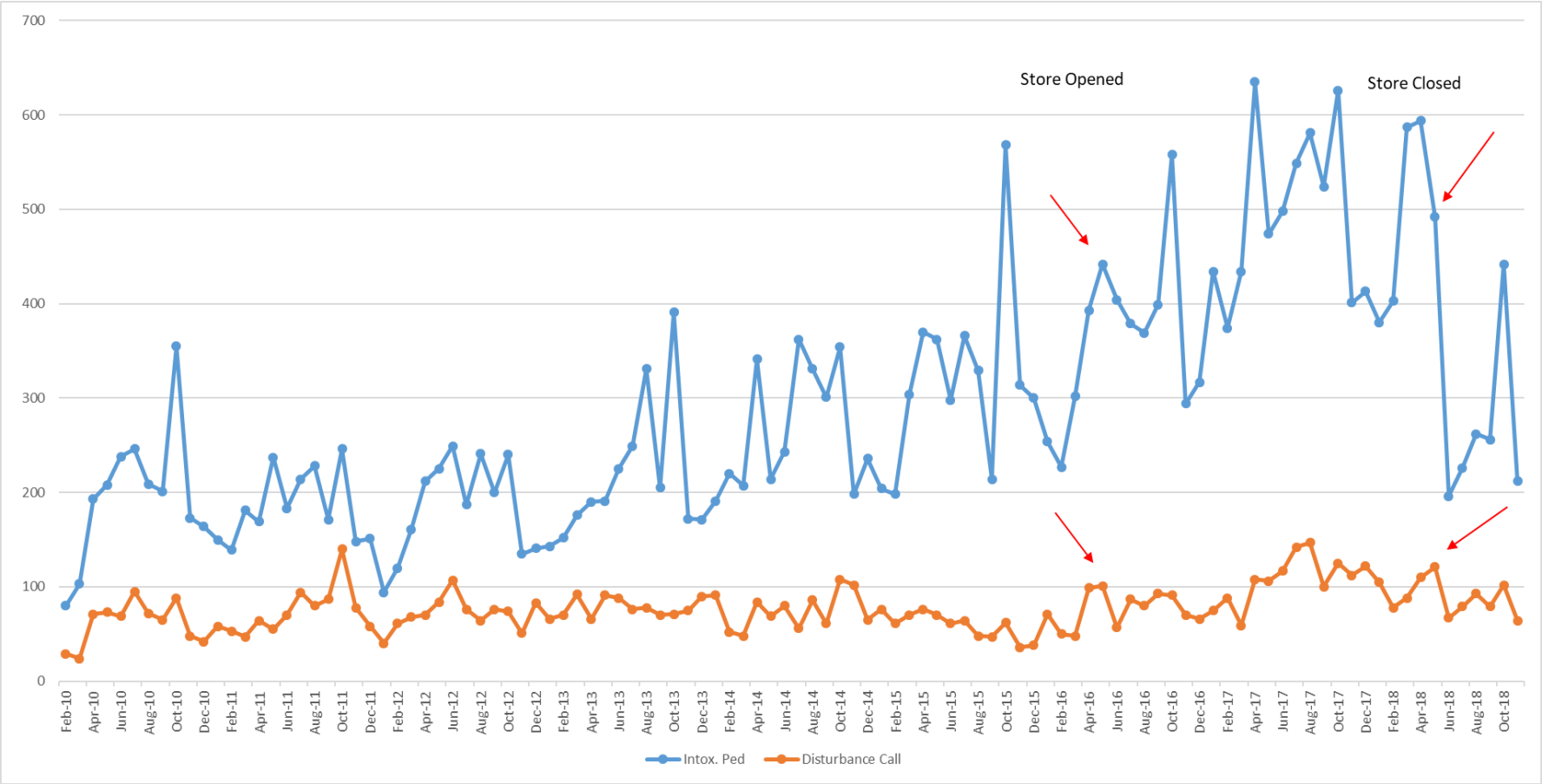


Figure 7 Intoxicated Pedestrian and Disturbance Calls by month

In order to assess the effect of the local option vote on intoxicated pedestrian and disturbance calls more rigorously, we modeled the each set of counts, separately and combined, using negative binomial time series analysis with robust standard errors. After taking into consideration seasonality, we found a steady increase over time (0.7% increase per month, monthly beta coefficient = 0.007, $p<0.001$) plus an increase of approximately 48% during the time the store was open (store beta coefficient = 0.389, $p<0.001$). Figure 8 shows the predicted vs actual values for Intoxicated Pedestrian Calls from 2012 through 2018. We found similar results when modeling the sum of the monthly counts for Intoxicated Pedestrians and Disturbance Calls (46% increase when the store was open, 0.6% increase per month). We were not able to develop an acceptable model for the monthly Disturbance Call counts alone. This may be related to an uptick in Disturbance Call after the liquor store had already been open for about a year.

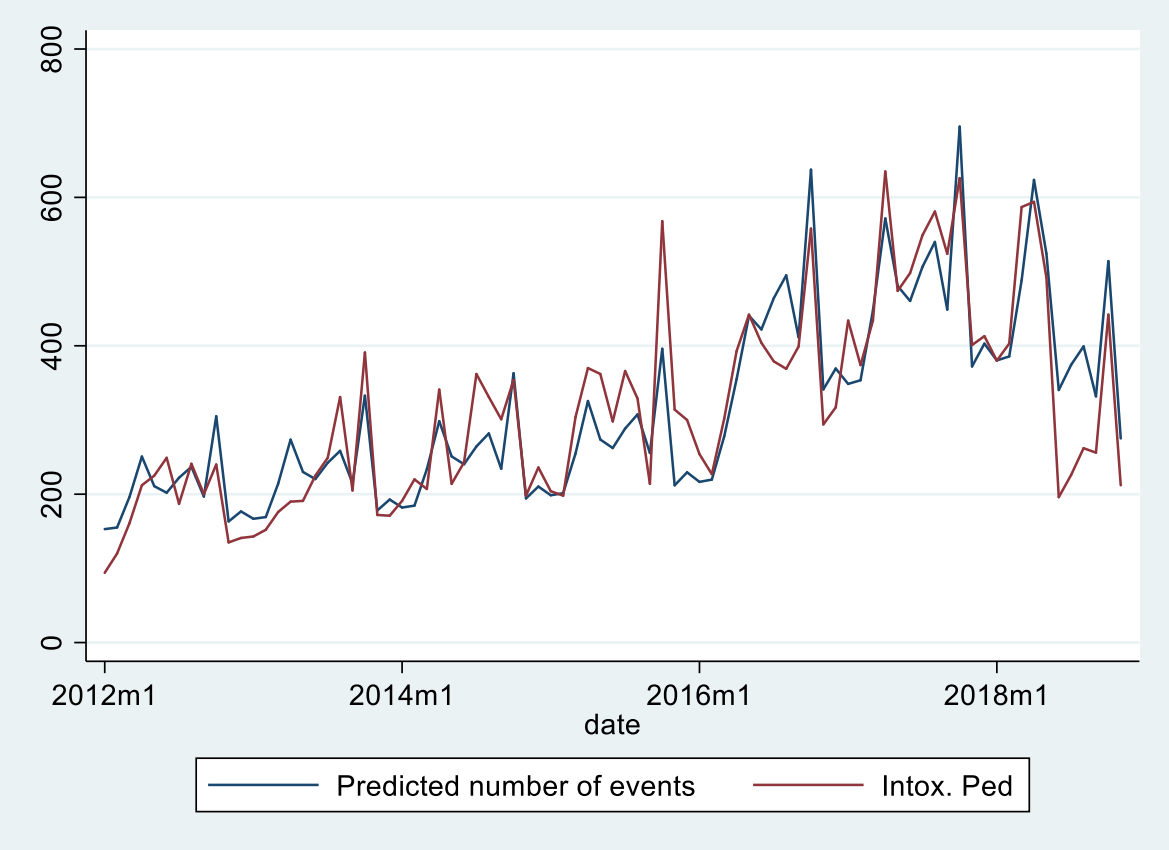


Figure 8 Predicted vs Actual, Intoxicated Pedestrian Calls

Figure 9 depicts Domestic Violence calls from February 2010 through November 2018. Visual inspection shows that DV call volume was higher while the store was open than between 2010 and mid-2015; however, DV calls spiked at the end of 2015, more than 6 months before the liquor store opened. DV call volume was also lower during the last 5 months that the store was open. Therefore, while it is possible that the liquor store contributed to the sustained level of DV calls between May 2016 and July 2017, the BPD call data does not provide strong evidence that liquor store caused the increase in DV call volume from 2013 through 2015 or the decrease in DV call volume in 2018. Regression analysis provides evidence for an increase in DV call

volume over time but the liquor store status (open/closed) was not a statistically significant factor in the regression models and the models we considered did not fit the 2018 data well. DV falls into the category of crimes against people - which also includes assault, robbery, sexual assault, and sexual abuse of a minor. The majority of calls for crimes against people are for assault. Figure 10 depicts Assault calls from February 2010 through November 2018 and Figure 11 shows all calls for crimes against people.

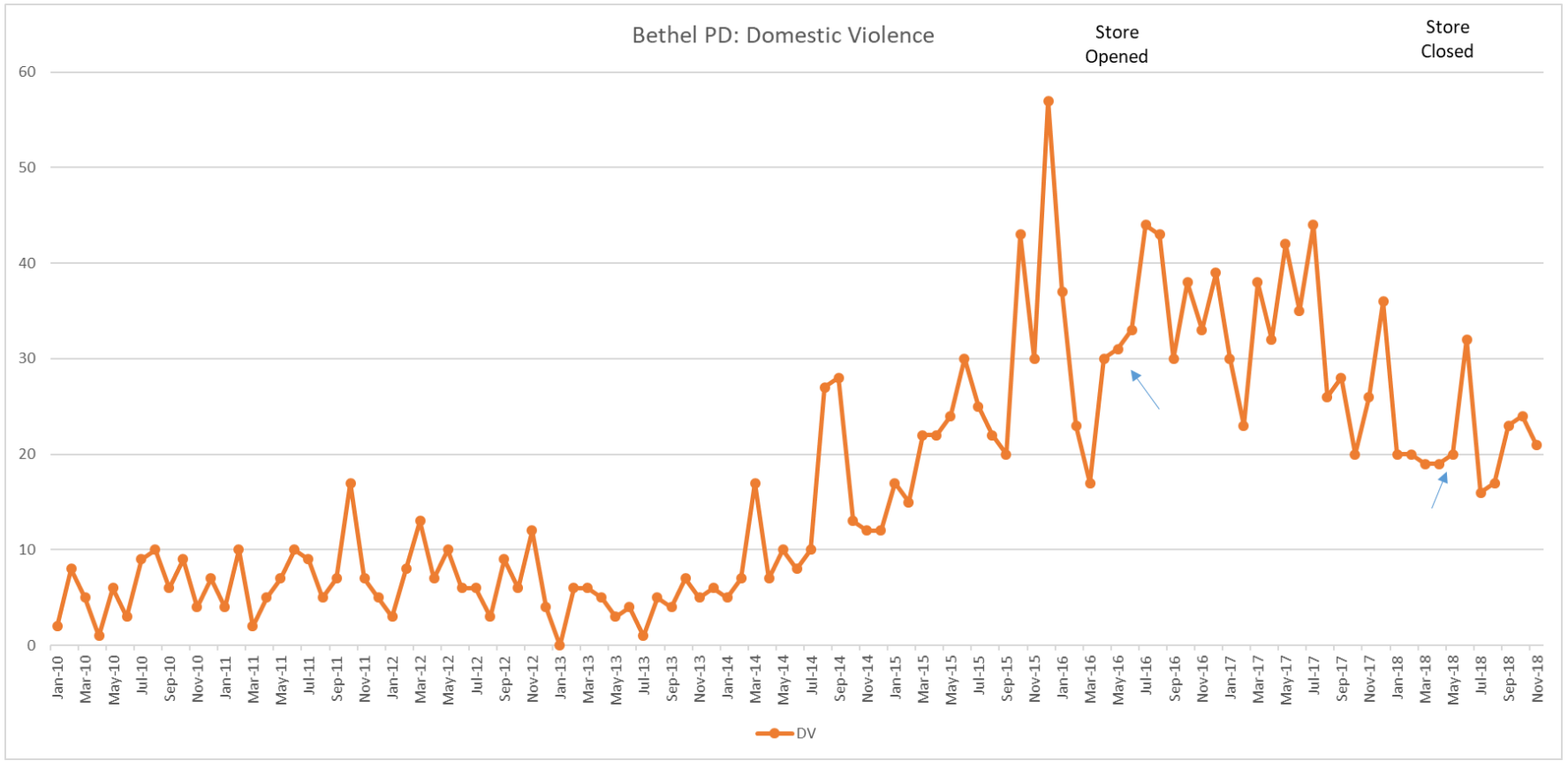


Figure 9 Domestic Violence call, by month

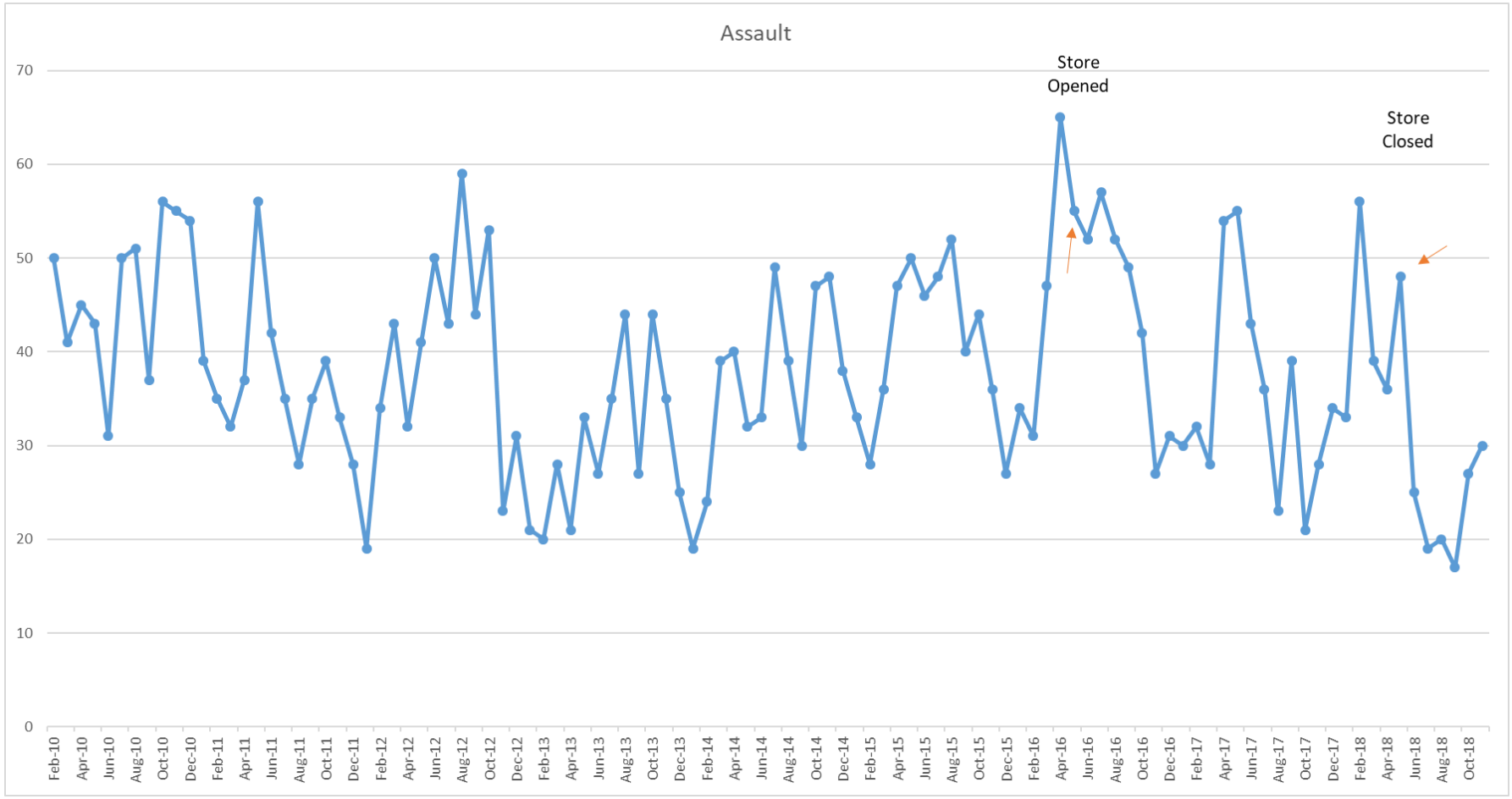


Figure 10 Assault Calls, by month

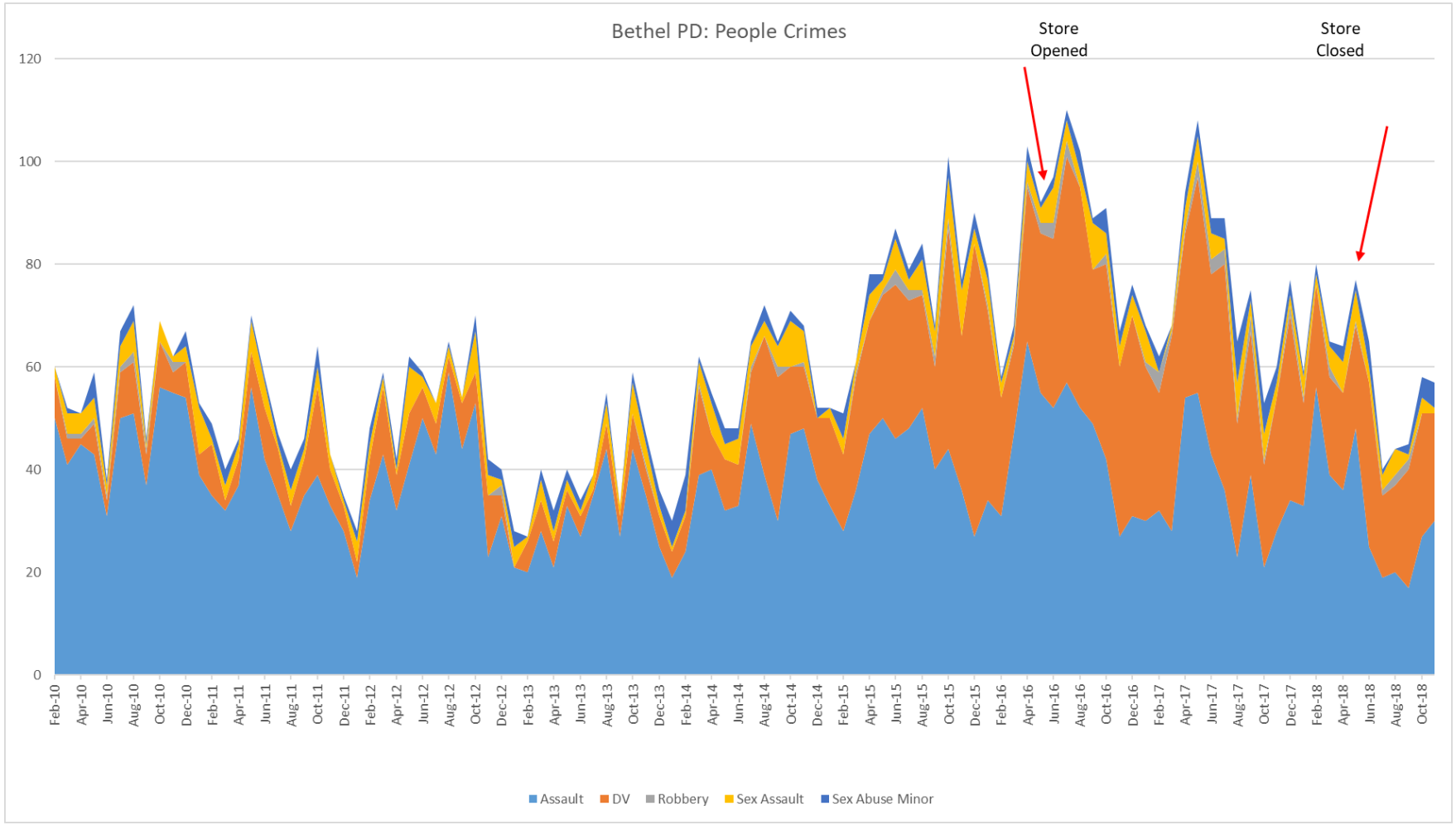


Figure 11 Crimes against people, by month

While an association between assault call volume and liquor store status may not be apparent through visual inspection, regression analysis shows a small, but statistically significant association with assault calls up approximately 22% when the liquor store was open, adjusting for month of year and monthly decrease over time (store beta coefficient = 0.199, p = 0.034). The small monthly decrease was not statistically significant but including it in the model provided for a much better fit to the data (monthly beta coefficient = -0.003; p = 0.167). Figure 12 shows the predicted vs actual values for Assault calls.

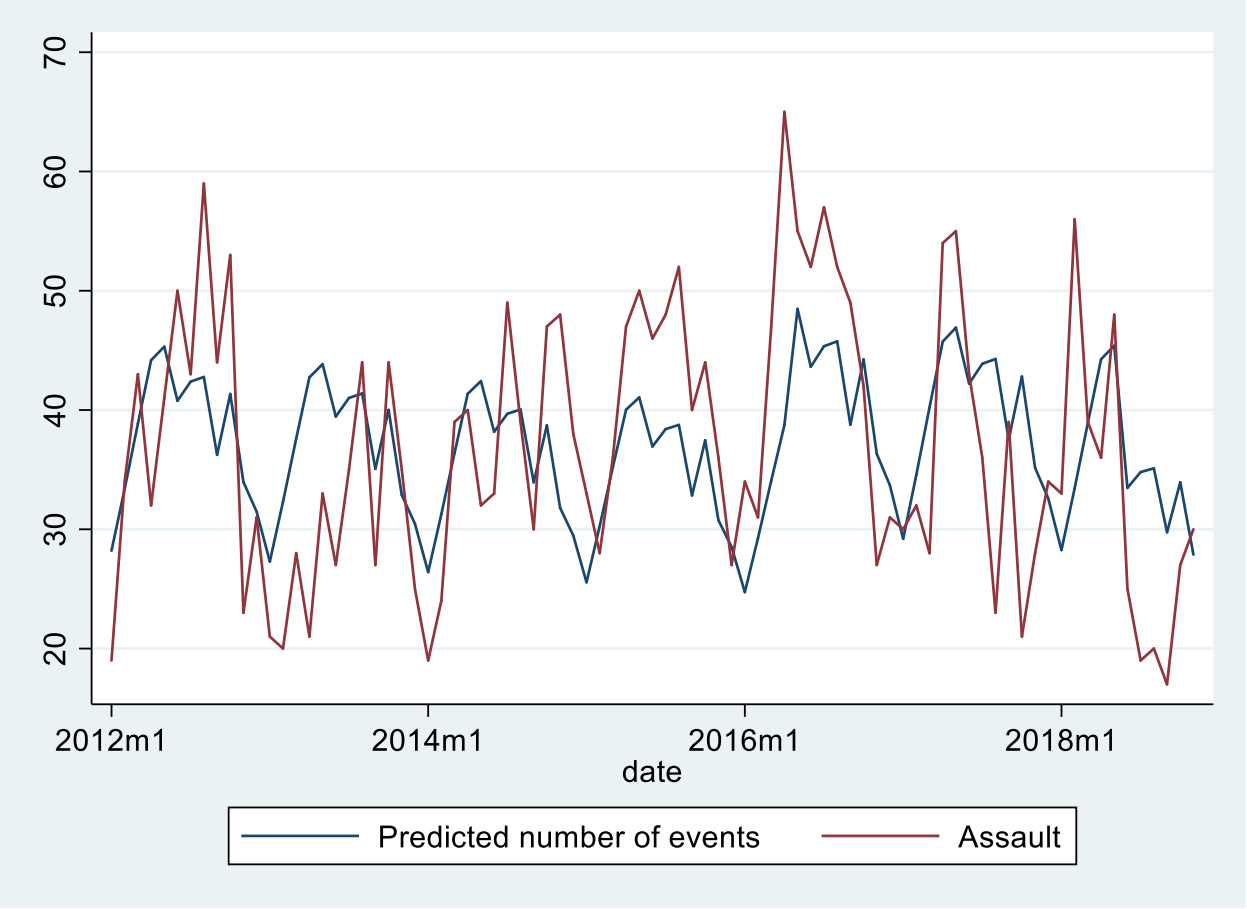


Figure 12 Actual vs Predicted Assault calls, by month

Modeling all crimes against people together found similar association between call volume and liquor store status with total call volume for crimes against people up approximately 22% when the liquor store was open, after adjusting for seasonality and change over time (store beta coefficient = 0.198, p = 0.027). Figure 13 shows the predicted vs actual values for all crimes against people.

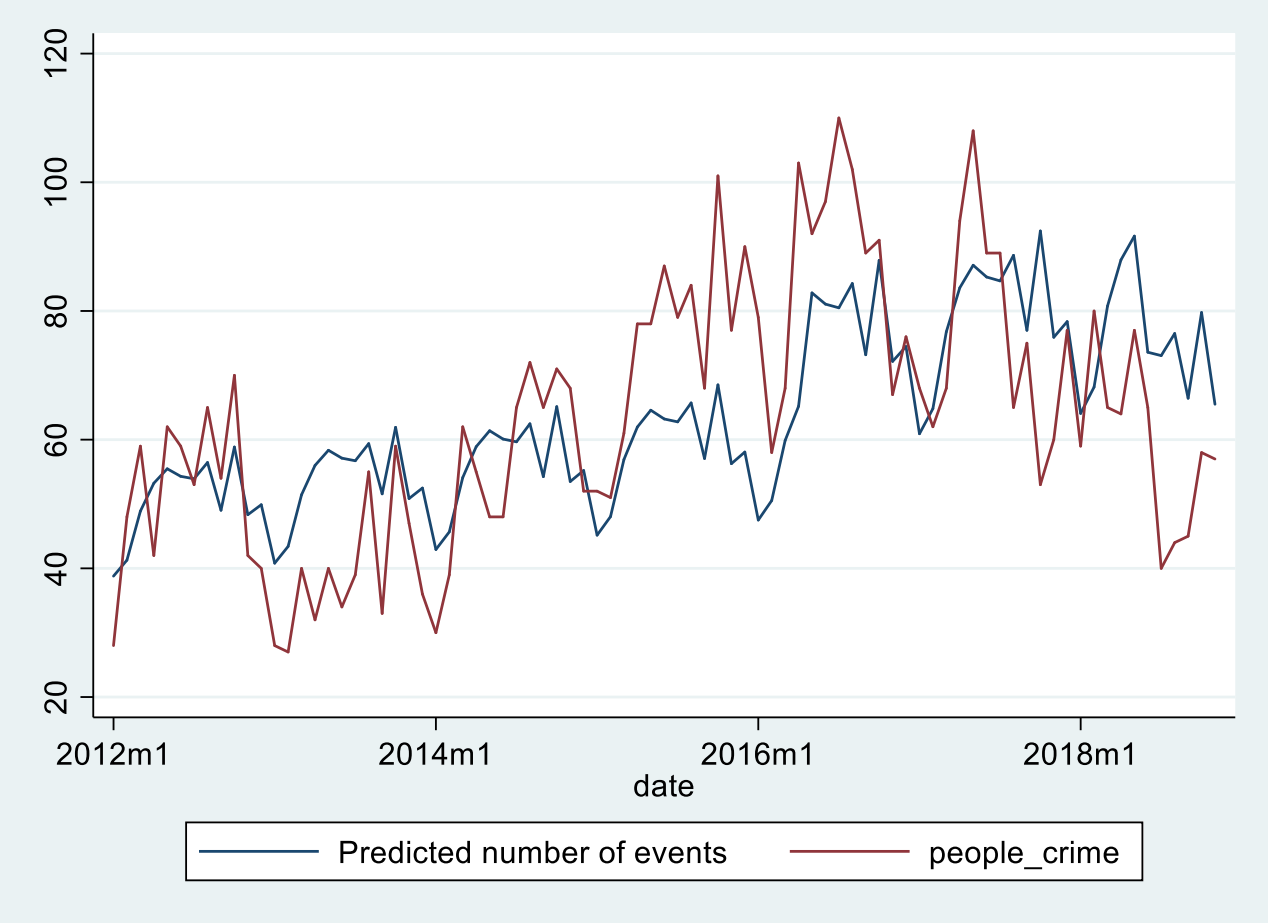


Figure 13 Actual vs Predicted calls for Crimes against People, by month

Figure 14 depicts monthly counts of BPD calls for crimes against property – burglary, damaged property, theft, vehicle theft, and trespass – from February 2010 through November 2018. Visual inspection of the graph suggest seasonality and an increase over time leading up to the opening of the liquor store but a decrease approximately 6 months after the store opened. Regression analysis provided no evidence of an association between liquor store status and property crime call volume.

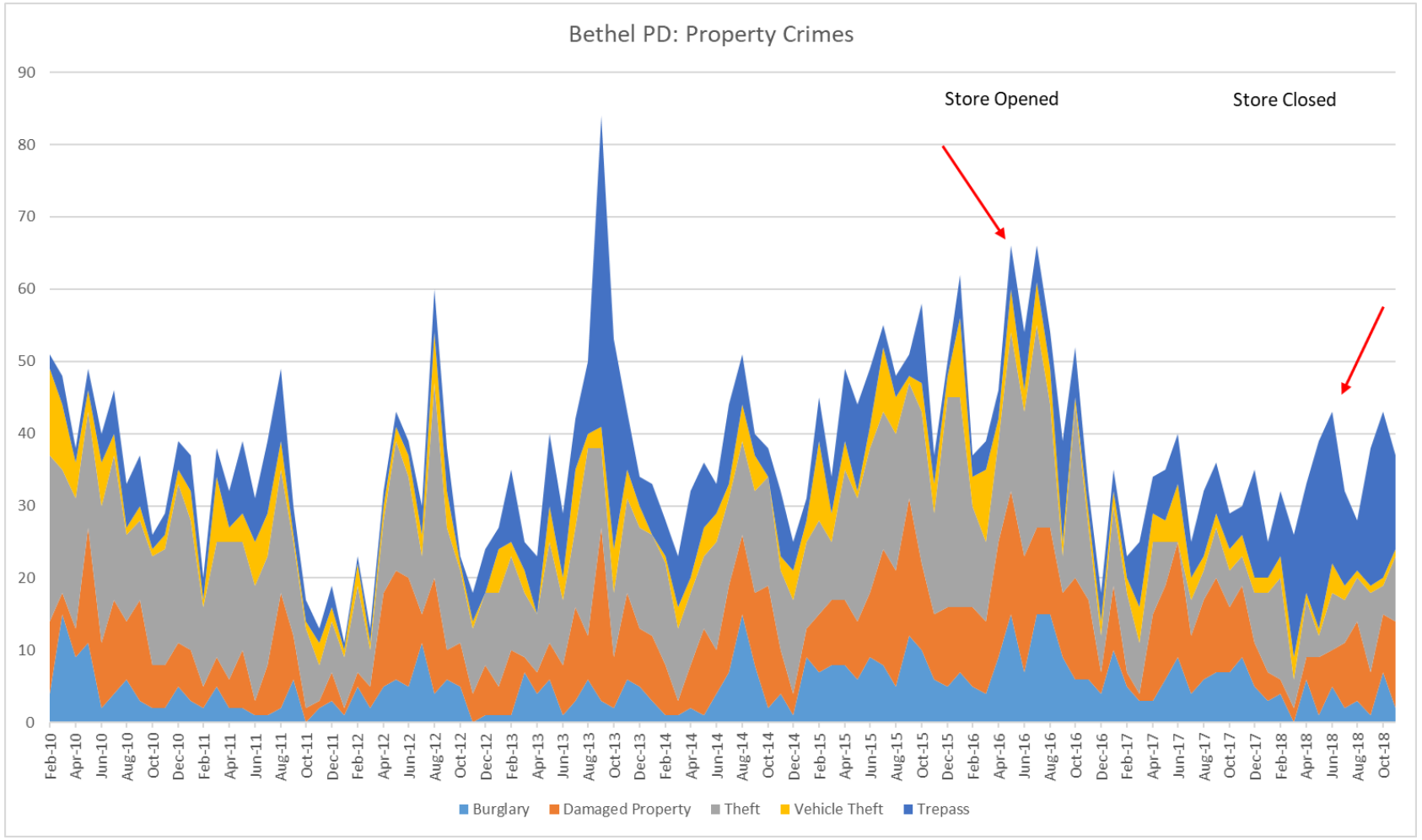


Figure 14 Crimes against property, by month

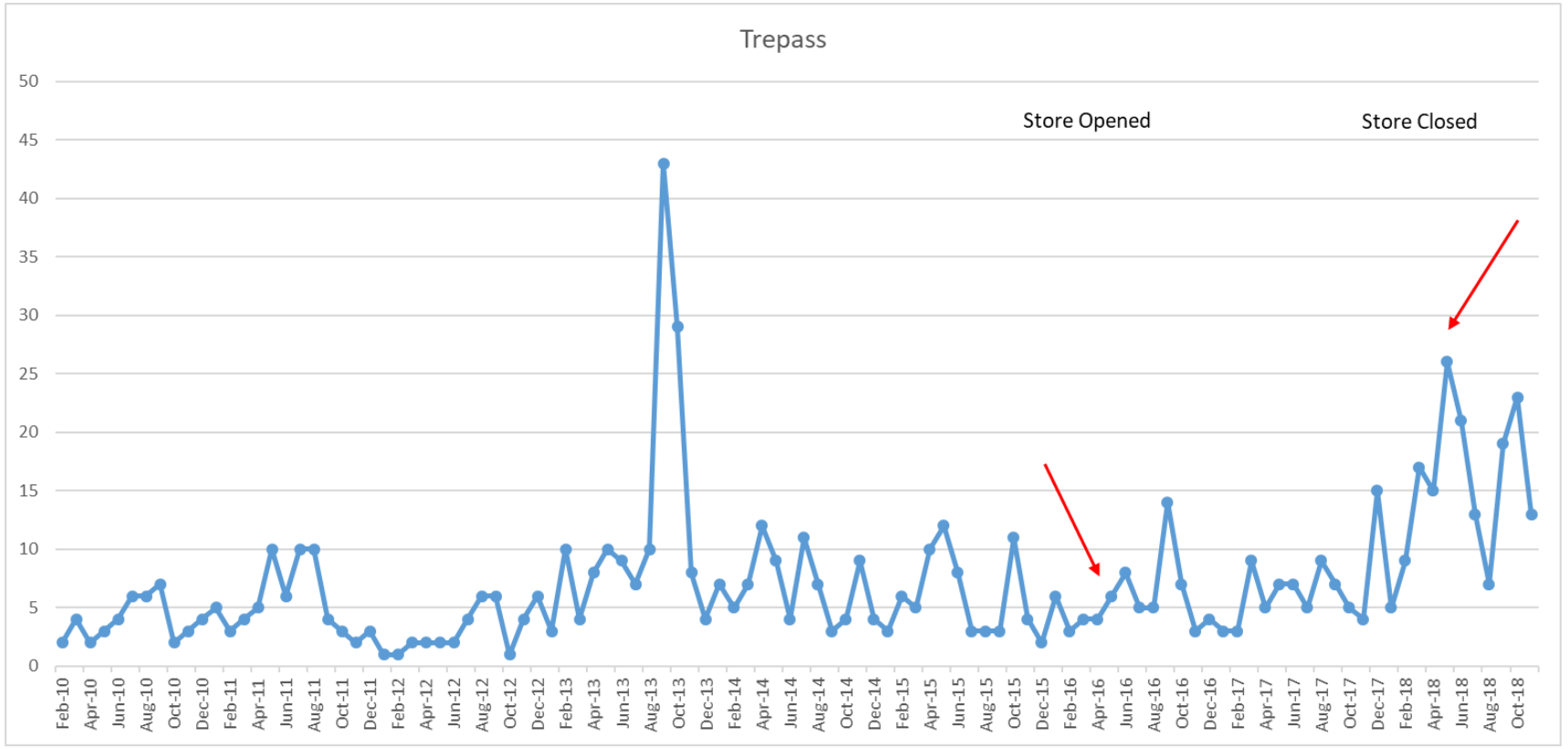


Figure 15 Trespass, by month

Similarly, there was no evidence of an association between liquor store status and the monthly call volume related to burglary, damaged property, theft, or vehicle theft when analyzed separately. Trespass, however, was slightly different. Figure 15 shows monthly calls for Trespass from February 2010 through November 2017. Regression analysis showed that after adjusting for seasonality and change over time, the liquor store being open was associated with a 29% decrease in trespass call (store beta coefficient = -0.339, p = 0.013). Figure 16 shows predicted vs actual monthly counts for trespass calls from January 2012 through November 2017.

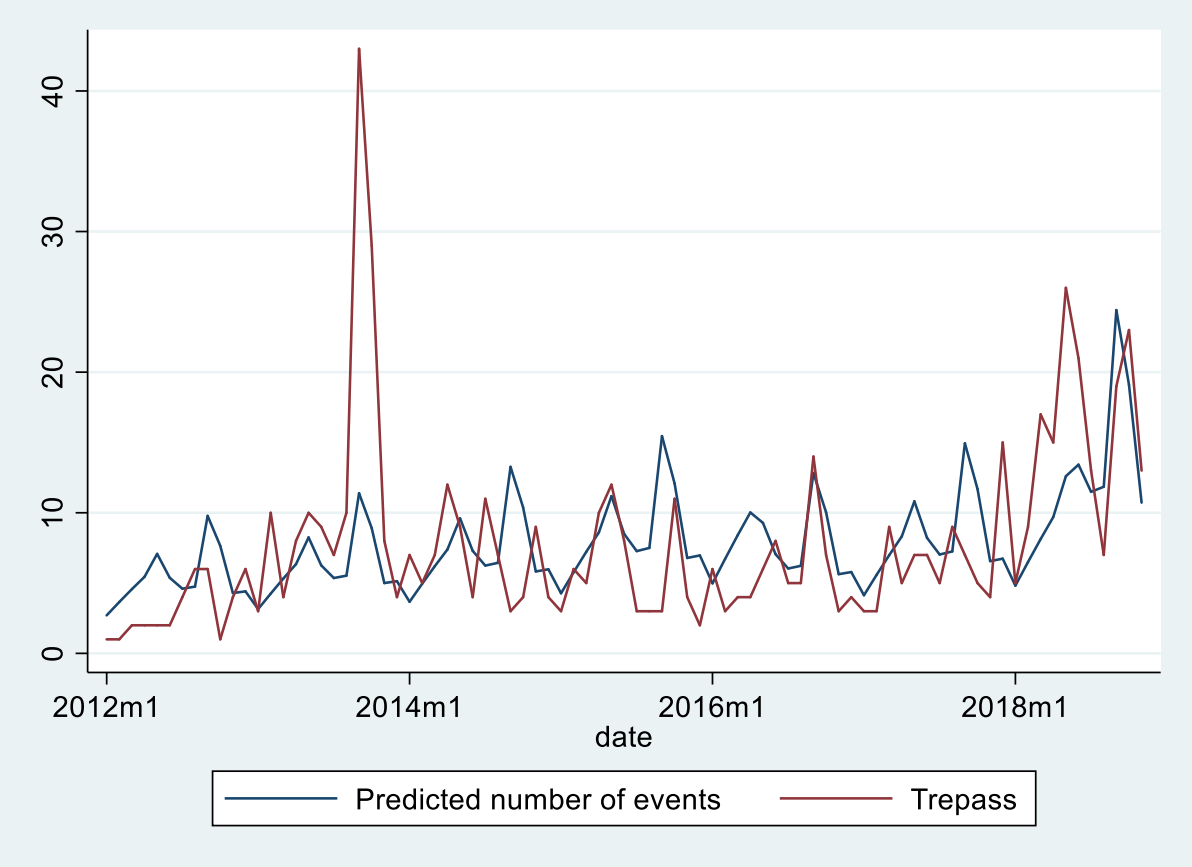


Figure 16 Actual vs predicted calls for Trespass, by month

Traffic calls include driving under the influence (DUI), hit and run, traffic accident, and traffic stop. Figure 17 depicts monthly calls for all traffic categories from February 2010 through November 2018. Figure 18 shows monthly calls for DUI for the same time period, and Figure 19 shows monthly calls for hit and run.

Regression analysis showed that after adjusting for seasonality and change over time, the liquor store being open was associated with a 23% increase in calls for DUI (store beta coefficient = 0.205, p = 0.009). Figure 20 shows predicted vs actual monthly counts for DUI calls from January 2012 through November 2017. Similarly, regression analysis showed that after adjusting for seasonality and change over time, the liquor store being open was associated with

an 88% increase in calls for hit and run (store beta coefficient = 0.205, p = 0.009). Caution should be used in interpreting these results as the mean number of hit and run calls per month is low (2.1 per month). Figure 21 shows predicted vs actual monthly counts for hit and run calls from January 2012 through November 2017. Results may have differed if data from 2010 and 2011 had been included.

Regression analysis does not show an association between the liquor store and the monthly count for all traffic calls combined. Regression also did not show an association between the liquor store and the monthly counts for traffic accidents or traffic stops.

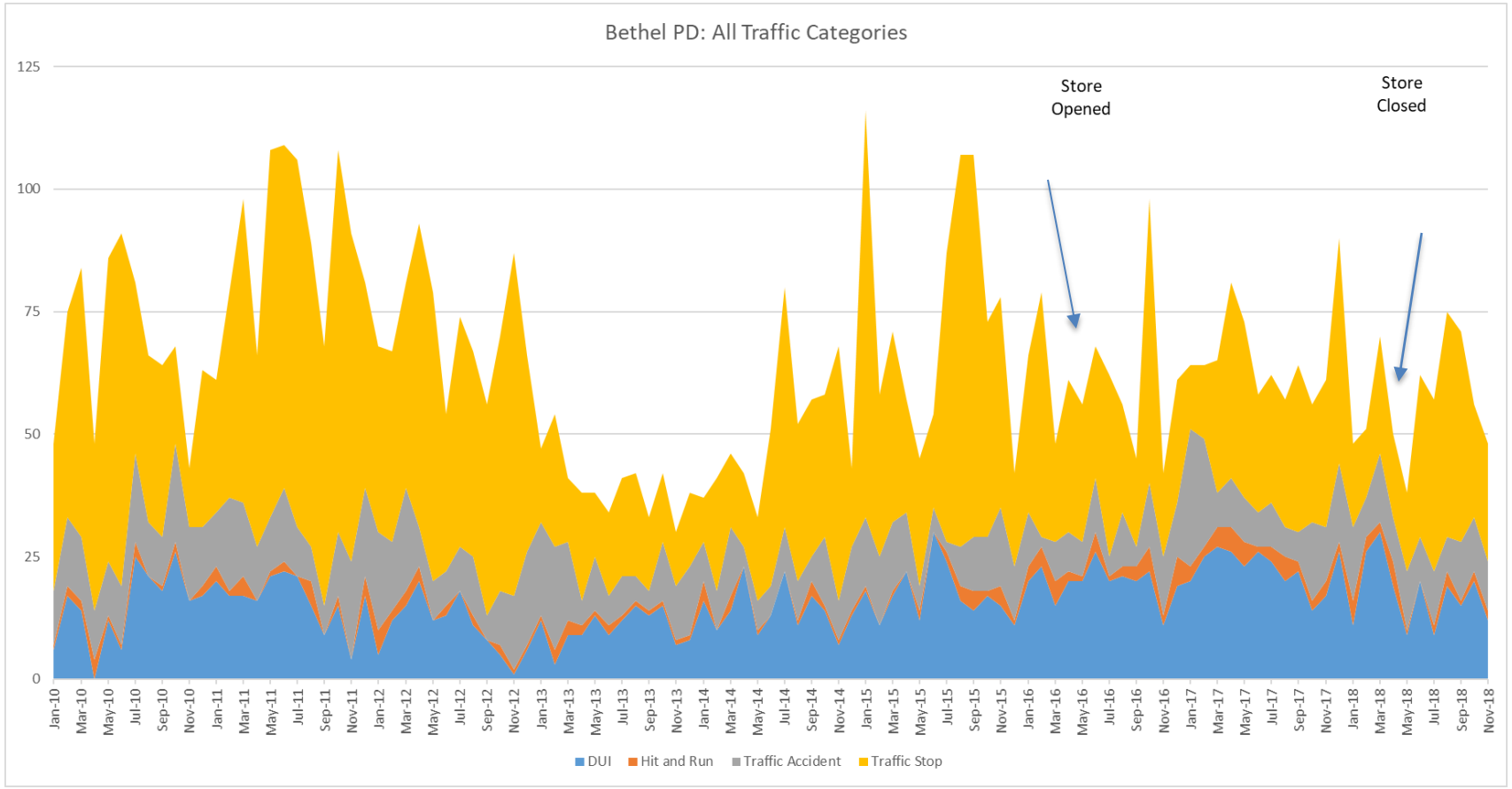


Figure 17 All traffic calls, by month

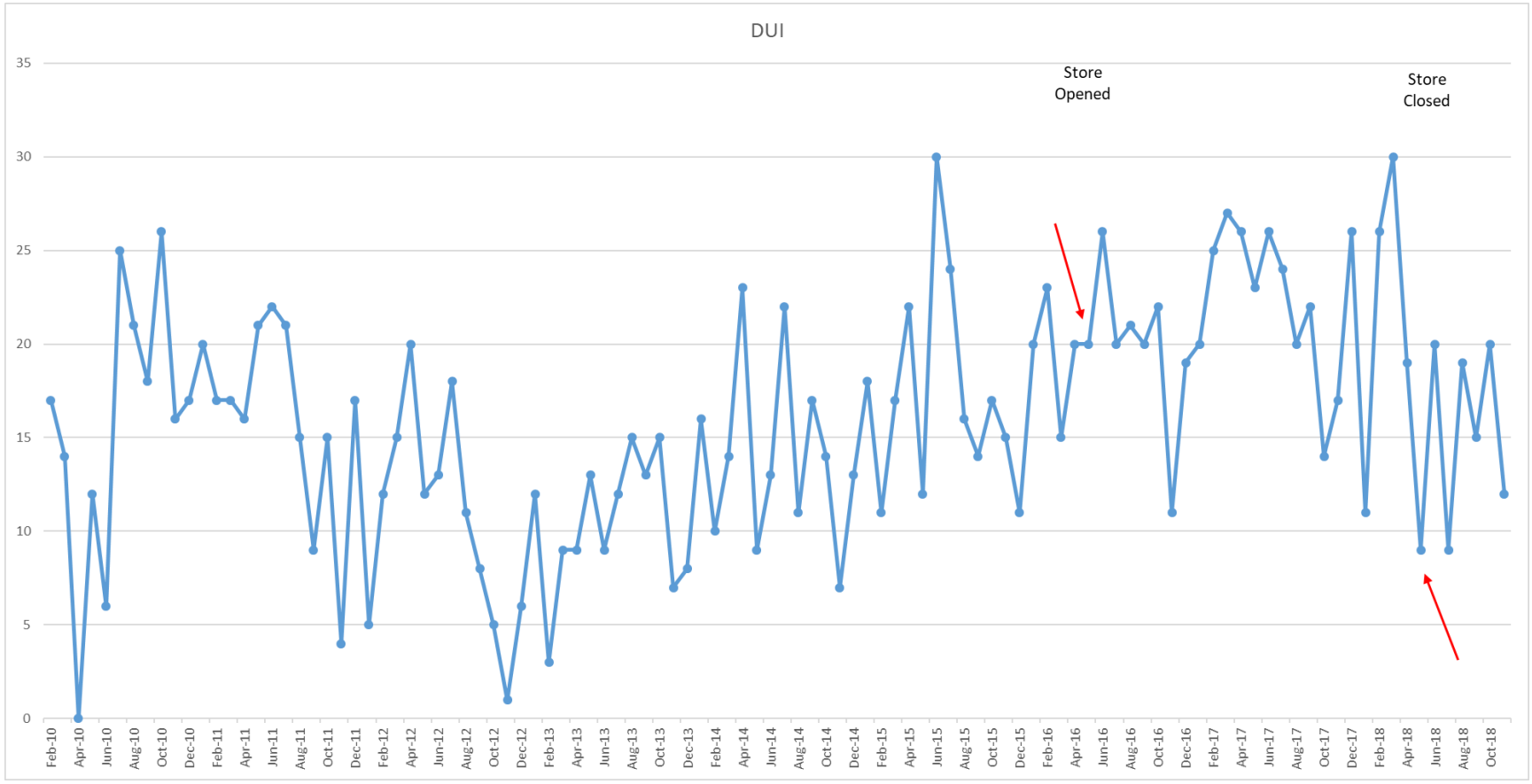


Figure 18 DUI, by month

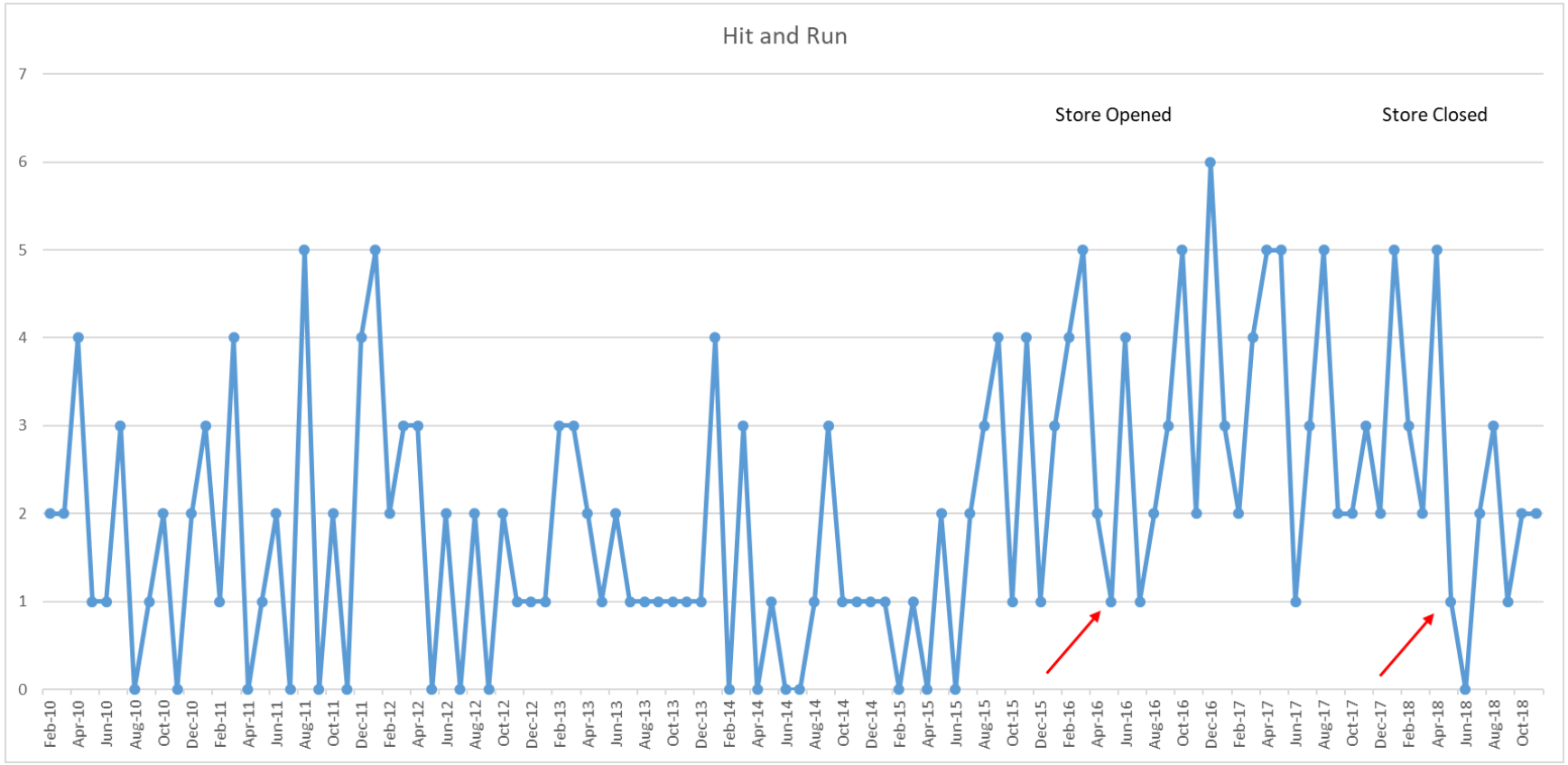


Figure 19 Hit and run, by month

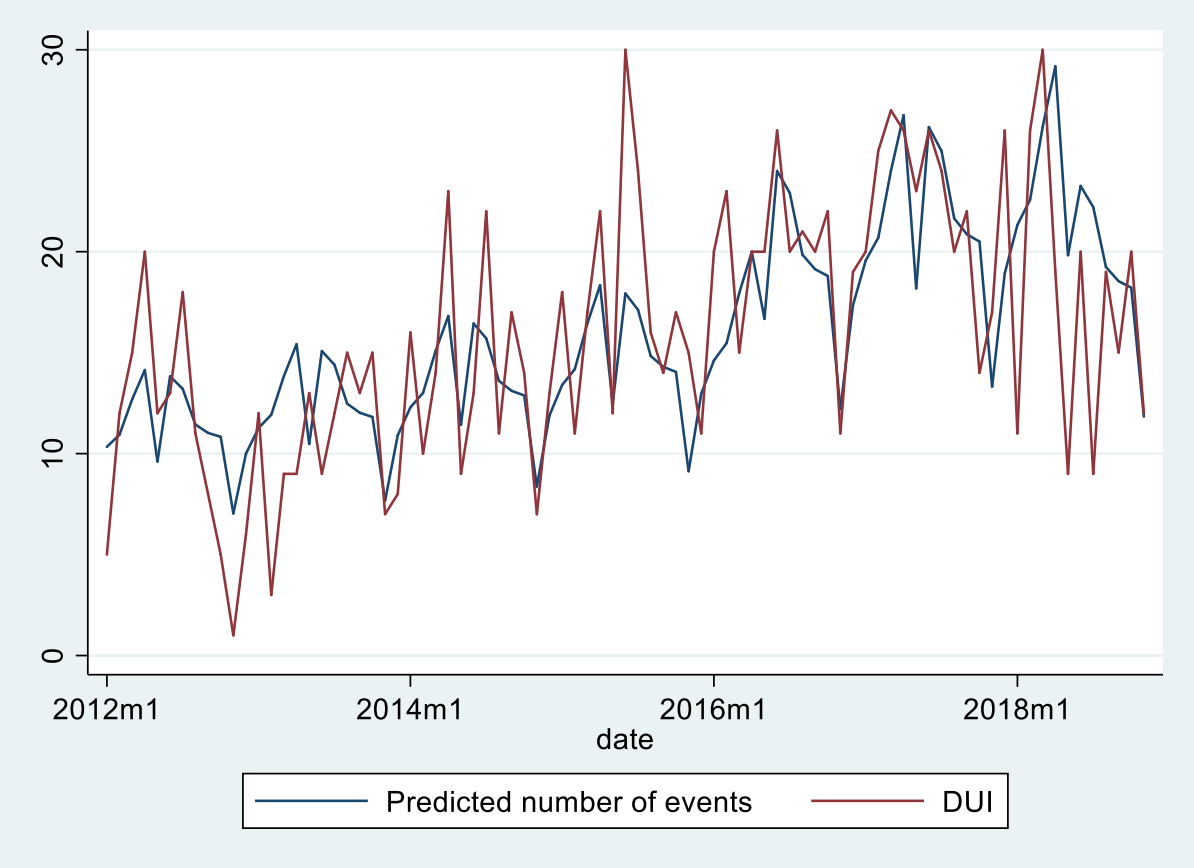


Figure 20 Actual vs predicted calls for DUI, by month

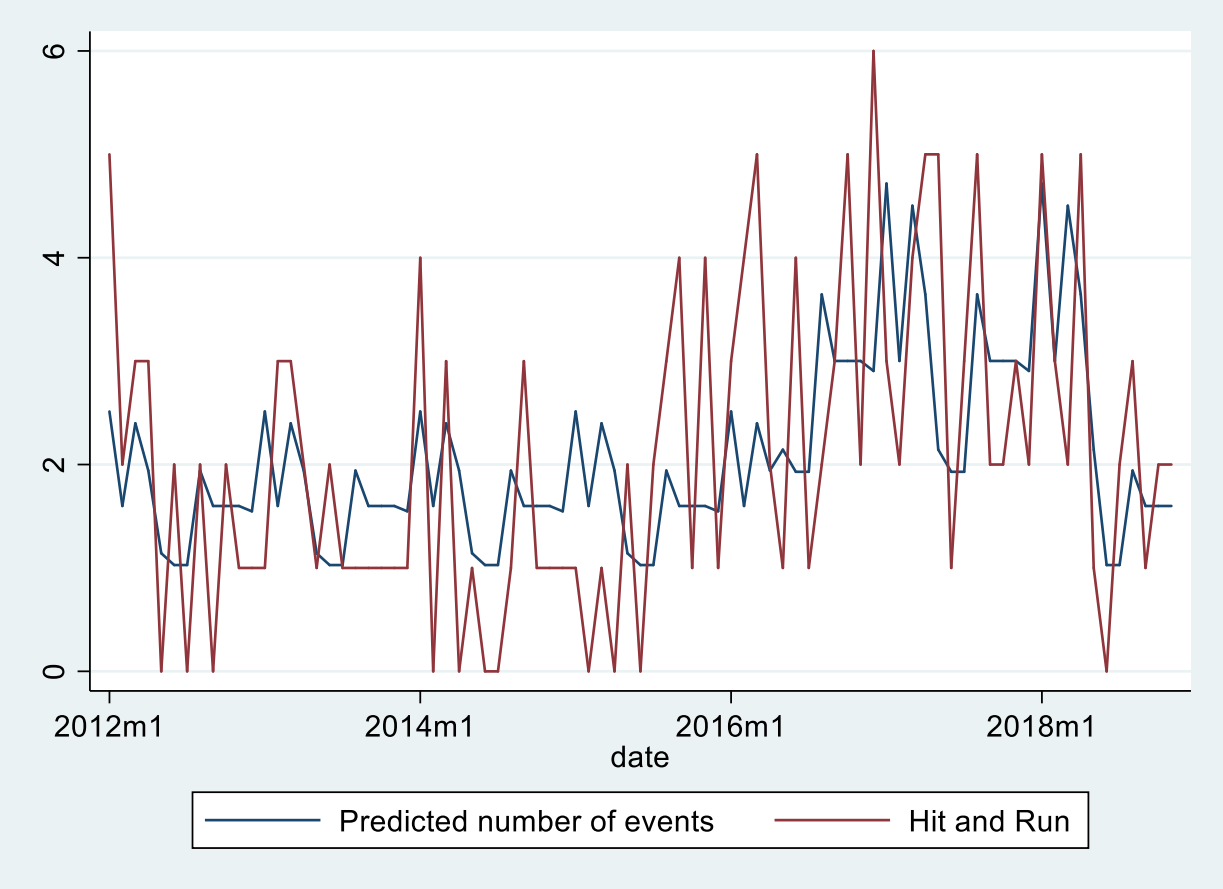


Figure 21 Actual vs predicted calls for hit and run, by month

Figure 22 shows the monthly call counts for suicide attempts. Visual inspection shows elevated call volumes during the second half 2015 and continuing through to the third quarter of 2017. Thus, there was some overlap between this time-period with high call volume for suicide attempts and the liquor store being open; however, the call volume increased before the store opened and decreased before it closed. Regression analysis shows seasonality and change over time but does not identify an association between liquor store status and calls for suicide attempts.

Figure 23 shows monthly call counts for unattended deaths. An unattended death means that the person was found dead, with no witnesses to the death. These deaths are investigated by the police to determine whether anything criminal was involved in the death. Visual inspection shows a similar pattern to suicide attempts in that the monthly call volume appeared to increase in mid-2015, however the elevated call volume for unattended deaths continued longer than for attempted suicide. We urge caution in interpreting these observations. The mean number of calls for unattended deaths is very low (0.96 per month), making it difficult to model the data and identify trends.

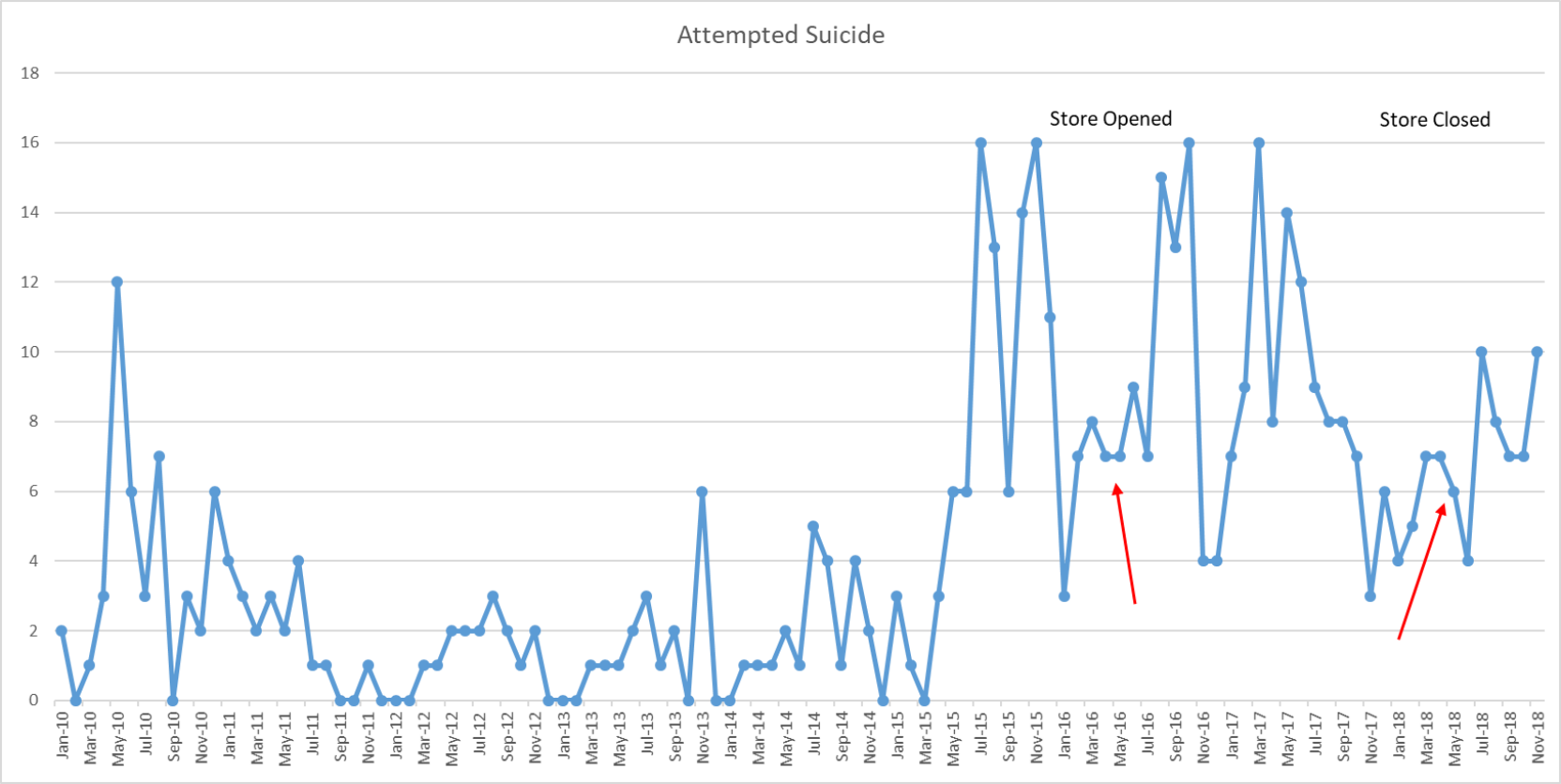


Figure 22 Attempted Suicide Calls, by month

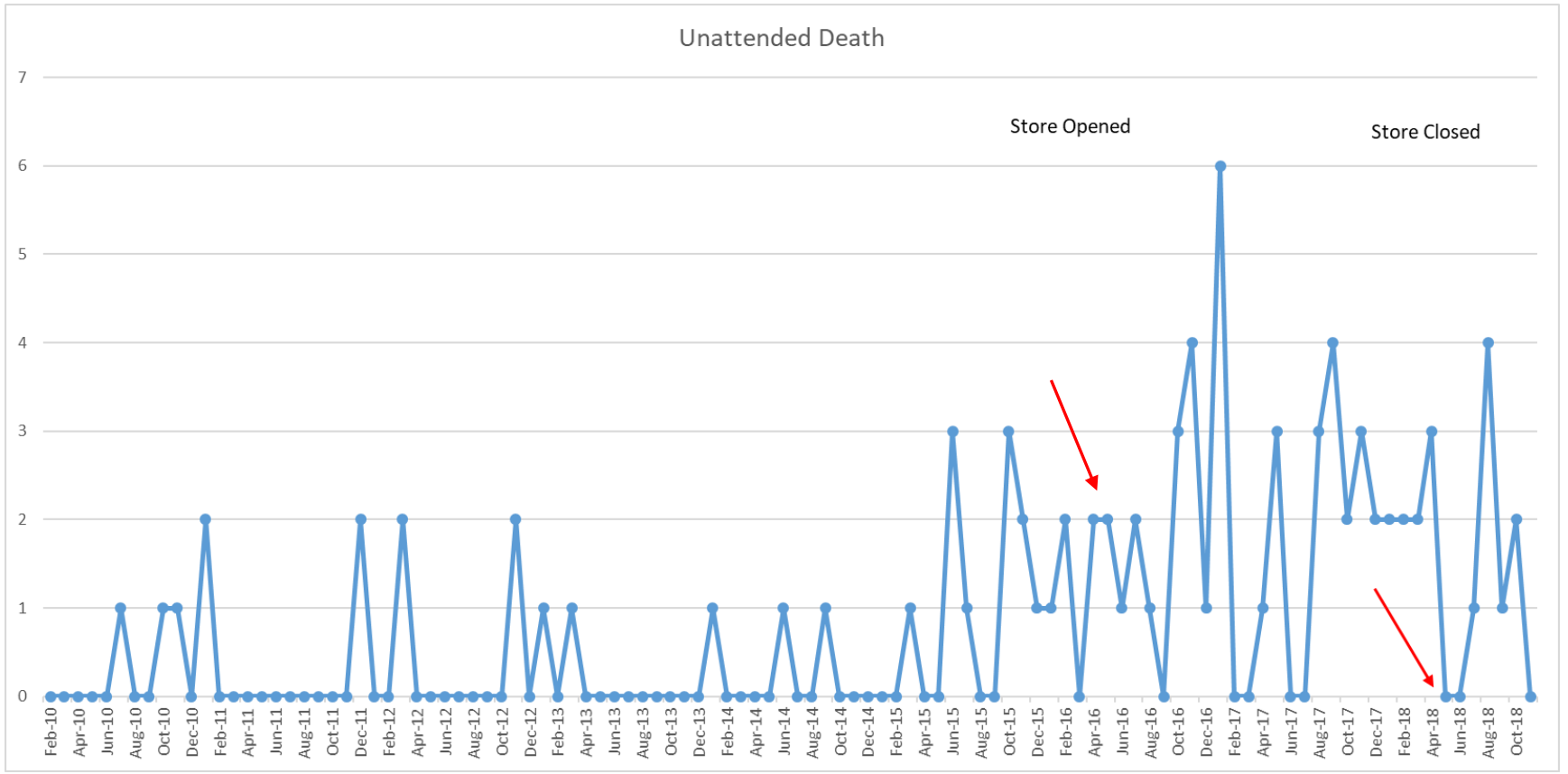


Figure 23 Unattended death, by month

The Other category for BPD calls comprises weapons offenses and three alcohol related categories – bootlegging, furnishing alcohol to a minor, and liquor law violations. Figure 24 shows monthly counts for weapons offenses from February 2010 through November 2018. Visually the call volume from mid-2015 through late 2016 appears higher than the call volume for 2012 through 2014 but similar to the call volume from 2010 through 2011. Visual inspection also suggests that the weapons offense call volume was elevated during the first 15 months that the liquor store was open but declined in the Fall of 2017 and remained lower through the end of the study period. There is a suggestion from regression analysis that after adjusting for changes over time, calls for weapons offenses was approximately 40% higher while the liquor store was open; however, this finding was not statistically significant (store beta coefficient = 0.354, P=0.119). Figure 25 shows actual vs. predicted for weapons offenses.

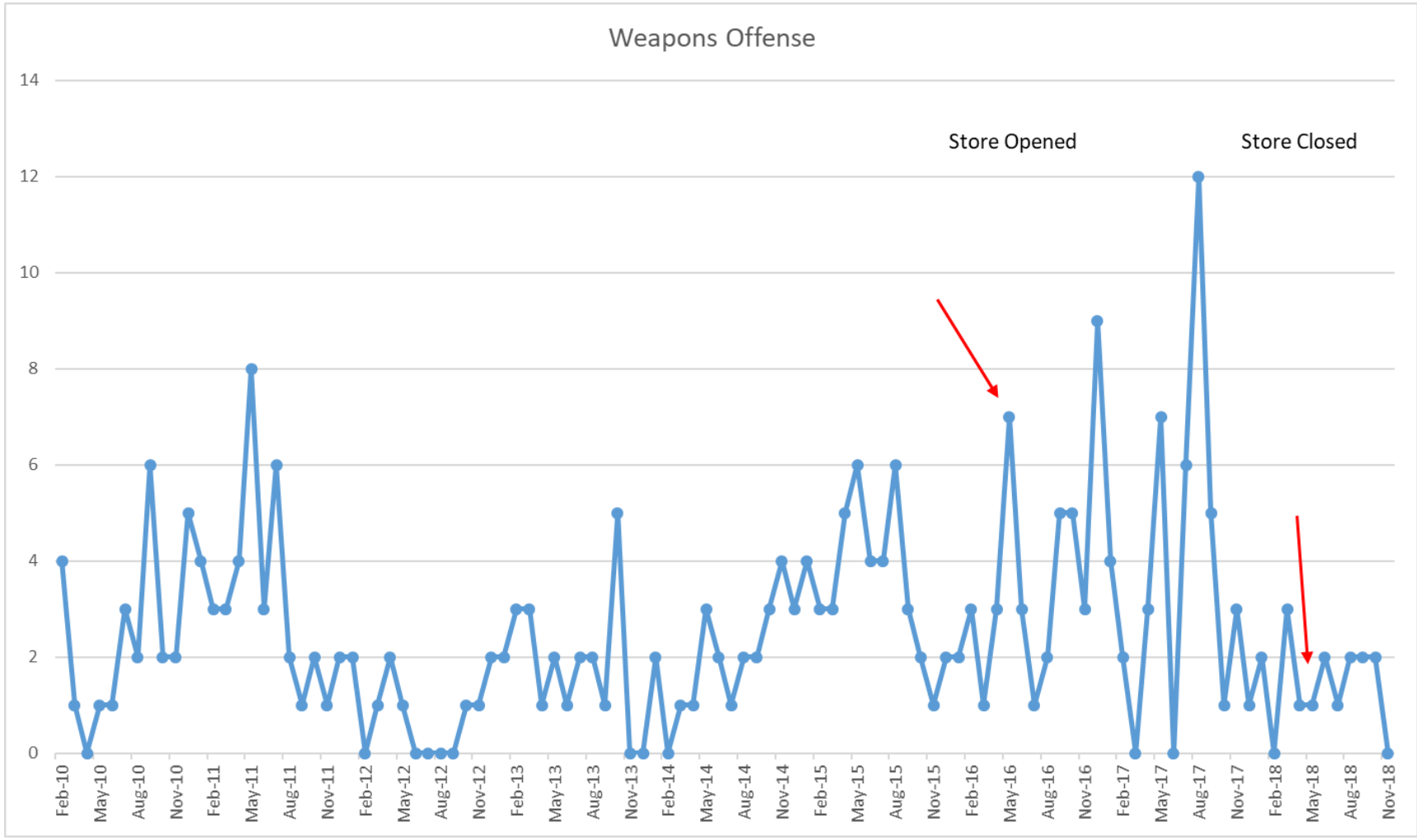


Figure 24 Weapons Offense calls, by month

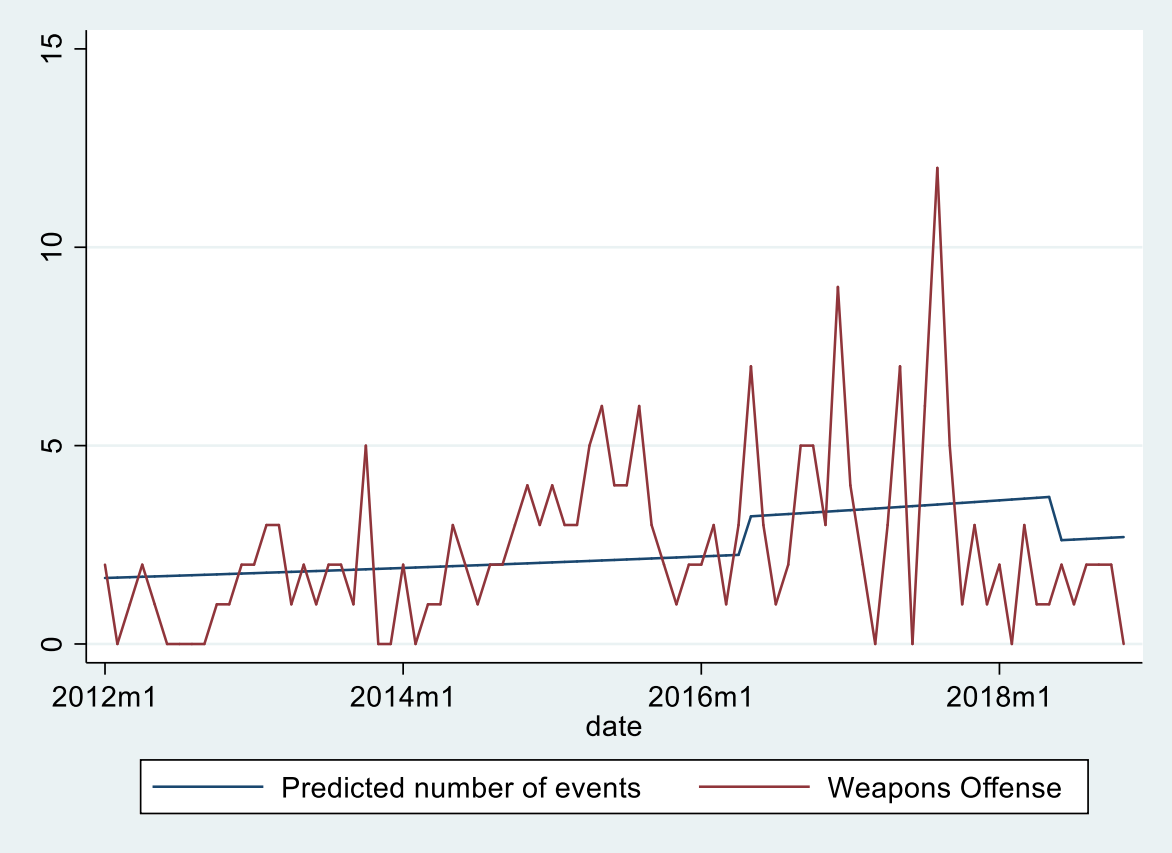


Figure 25 Actual vs predicted for weapons offenses

Calls for the three alcohol-related offenses – bootlegging, furnishing alcohol to a minor, and liquor law violations – all occur infrequently. Figure 26 shows monthly counts for all three of these categories for February 2010 through November 2018. Visual inspection shows higher call volume for 2014 through 2018 with a noticeable spike the month that the liquor store opened. However, aside from this one spike in activity, it is not clear that the higher monthly call volume for alcohol-related offenses is due to the liquor store since the call volume increased before the store opened and continued after it closed.

It should be noted that no call for bootlegging were recorded until April 2016, the month before the liquor store opened. After that, the number of bootlegging calls per month ranged from zero to four, with most of the calls concentrated between October 2017 and July 2018. Calls for furnishing alcohol to a minor occurred periodically across the study period, but the maximum number of calls per month was never higher than two. Liquor law violations also occurred throughout the study period, but were slightly more frequent between 2015 and 2017.
Given the small number of events in each category, we combined the three for regression analysis. However, even with the three categories combined, we were not able to develop an acceptable regression model.

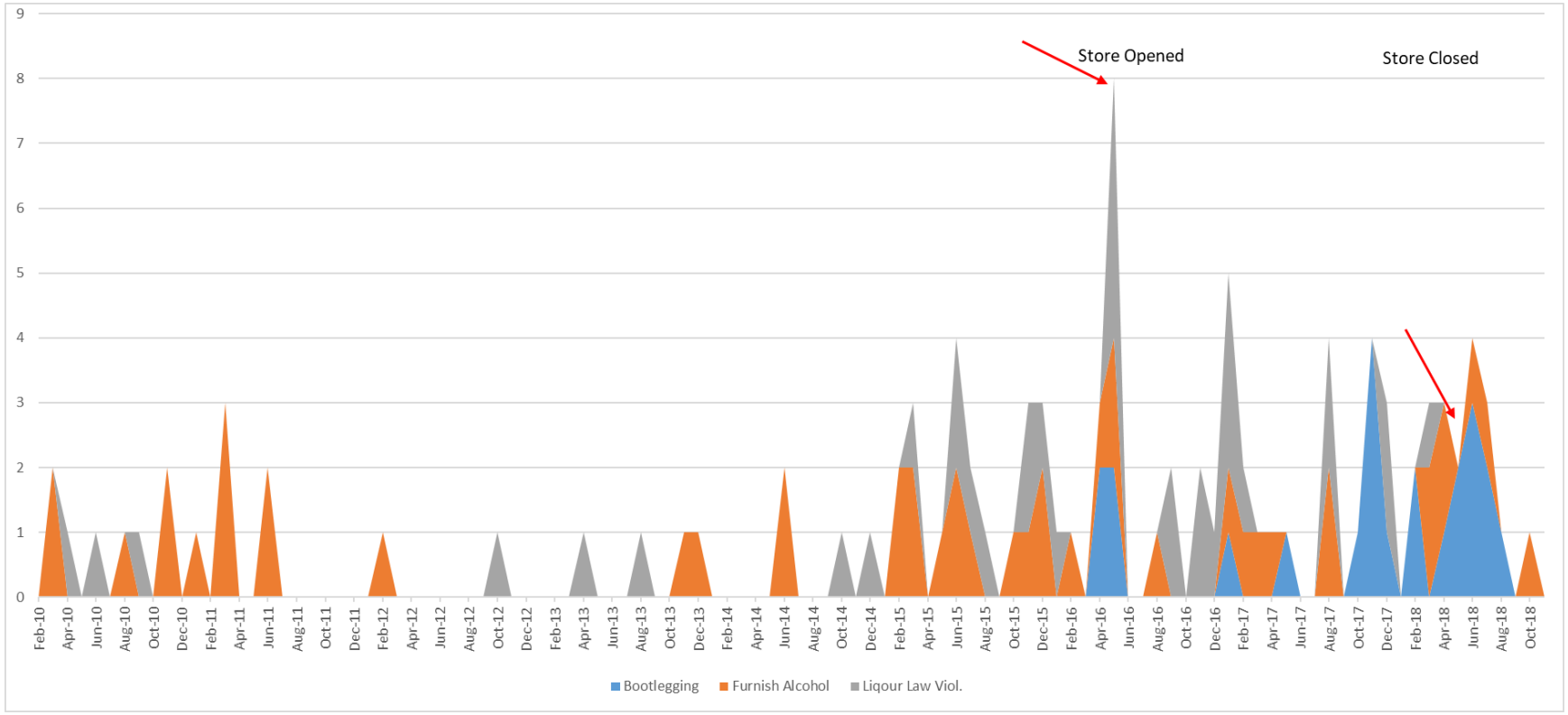


Figure 26 Other Alcohol-related call, by month

BPD Summary

The monthly call volume data provided by the BPD for January 2010 through November 2018, allowed us to examine changes over time and evaluate the association between the police calls and the liquor store opening and closing. Because data were not available prior to 2010, we were not able to evaluate associations between police calls and changes in local option status.

Focusing on the data from 2012 through 2018, after the new system had been in use for a couple of years, we were able to use regression analysis to evaluate associations between call volume and liquor store status, adjusting for seasonality and changes over time. Intoxicated pedestrians were one of the most visible offenses that residents were concerned might increase with a liquor store. Our analysis showed that BPD calls for intoxicated pedestrians were almost 50% higher while the liquor store was open, on top of the small but steady increase over time that was observed for the entire study period.

There was also concern that crimes against people might be affected by the liquor store being open. Our analysis showed call volume for assault and for all crimes against people combined were approximately 20% higher when the liquor store was open. On the other hand, our analysis did not show evidence of higher call volume for property crimes.

Another area of concern was driving under the influence (DUI). Our analysis showed that DUI calls were also approximately 20% higher when the liquor store was open. Hit-and-run calls were also up, but the absolute number of hit-and-run calls is low making it difficult to model. Monthly volume of calls for a number of other categories – including suicide, unattended death, and weapons offenses – were higher than in earlier years when the liquor store was open, but the increase started before the store opened and, in some cases, continued after the store closed.

While there are many factors related to a liquor store that could affect BPD call volume, our analysis suggests that the liquor store being open was associated with an increase in the number of calls to BPD for certain types of offenses resulting in both an increased workload for BPD and a lower quality of life for some Bethel residents.

Alaska State Troopers (Bethel, Kusilvak, and Yukon-Koyukuk census areas), 2007 - 2017

Data

The Alaska State Troopers provided incident records from January 2007 through September 2017 for calls in the Bethel, Kusilvak, and Yukon-Koyukuk census areas for the following categories:

- Crimes against people
- Crimes against property
- Traffic
- Other crimes
- Activities

Data were also requested for October 2017 through December 2018 but those data have not yet been received. Figure 27 shows the Census Area boundaries across the state.

Results

There were a total of 26,080 incidents included in this dataset with 11,744 from the Bethel census area, 7,193 from Kusilvak, and 7,143 from Yukon-Koyukuk. The most incidents for the three census areas combined was 3254 in 2011 and the least was 1953 in 2013. Similarly, the most incidents in one year in the Bethel census, 1535, were recorded in 2011 and the fewest, 849, were recorded in 2013. Note: Because we only had 9 months of data for 2017, we excluded the 2017 numbers for these annual comparisons.

Table 1 summarizes annual incident counts from 2007 through 2017 for the Bethel Census area and Tables 2 provides the same information for the three census areas combined. The 2017 numbers reported only include the first 9 months of the year. Based the types of incidents that seemed most likely to be affected by changes in access to alcoholic beverages and a review of these numbers, we selected the following types of incidents for more detailed analysis:

- All incidents combined
- Driving under the influence
- Alcohol crimes
- Assaults
- Sexual assaults
- Deaths other than homicide
- Property Crimes
- Non-criminal activity

Primary analyses will use data from the Bethel census area and secondary analyses will focus on data from the three census areas combined. The column chart in Figure 28 depicts the monthly counts for all Trooper incidents in the Bethel census area from January 2007 through September 2017 and Figure 29 depicts the same information for all three census areas combined.

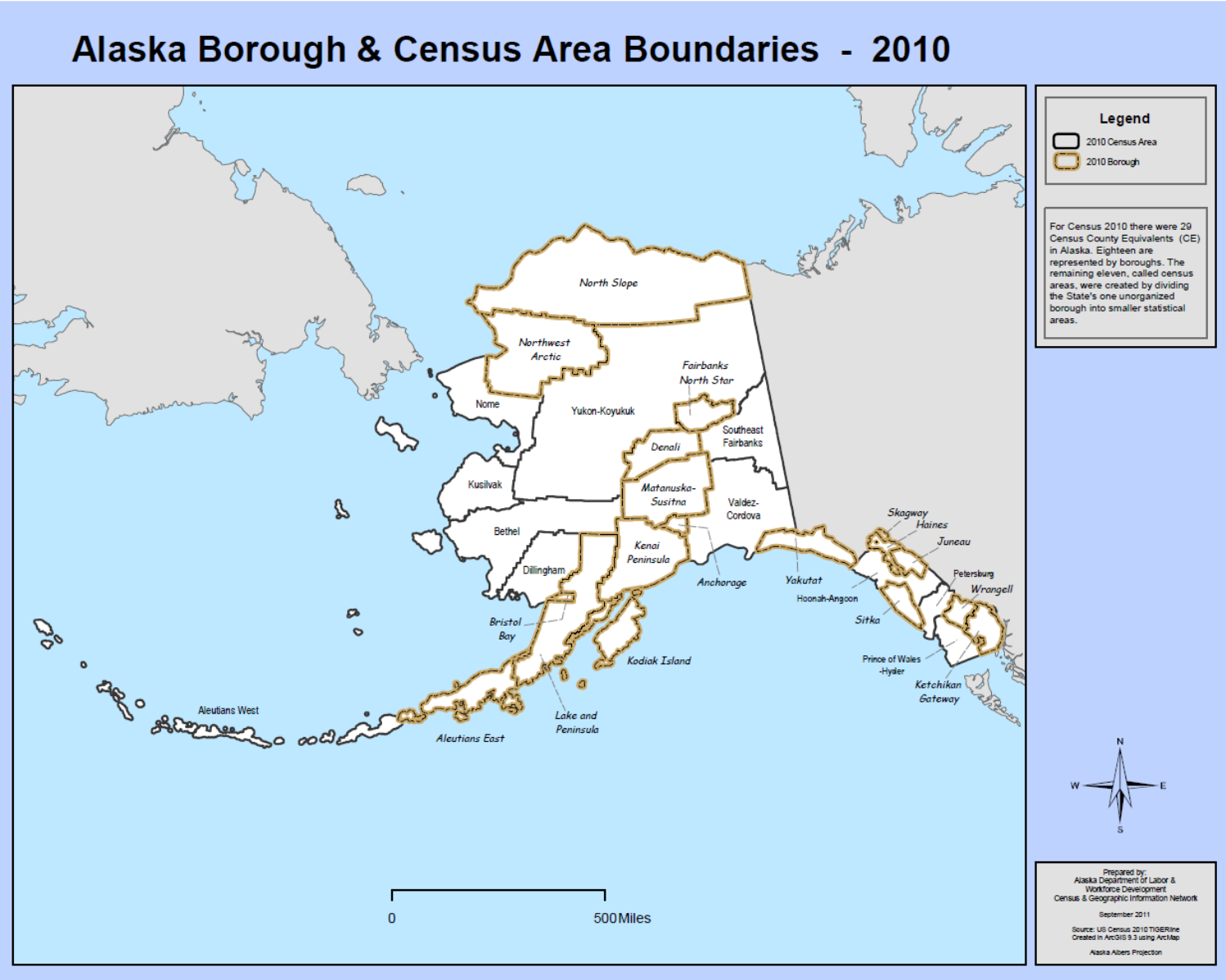


Figure 27 Alaska Census Areas (http://live.laborstats.alaska.gov/cen/maps/2010CNTY.pdf)

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*	Grand Total
Activity	**64**	**64**	**105**	**119**	**133**	**117**	**60**	**63**	**116**	**167**	**119**	**1127**
Deaths Other than Homicide	30	34	41	41	51	45	31	50	43	49	35	450
Municipal Ordinace Violation	0	0	0	2	3	1	0	0	0	0	0	6
Non-Criminal	34	30	64	76	79	71	29	13	73	118	84	671
Crime Against Person	**392**	**313**	**296**	**445**	**516**	**404**	**330**	**356**	**386**	**365**	**311**	**4114**
Assaults	257	198	204	260	369	284	227	237	262	217	215	2730
Harassment	20	20	18	52	23	31	13	23	20	16	14	250
Homicide	3	2		3	1	2	1	3	4	5	4	28
Offense Against Minors	6	7	7	7	15	14	6	10	6	6	6	90
Robbery	3	0	0	1	0	2	0	0	1	2	0	9
Sexual Assaults	58	48	29	56	55	41	47	44	63	78	49	568
Sexual Assaults of Minor	45	38	38	66	53	30	36	39	30	41	23	439
Crime Against Property	**229**	**209**	**167**	**222**	**263**	**173**	**129**	**109**	**126**	**98**	**102**	**1827**
Burglary	119	126	113	134	148	73	48	52	73	27	41	954
Criminal Mischief (Vandalism)	43	27	21	34	46	41	44	28	27	24	30	365
Financial Crimes	16	2	2	9	2	5	4	0	2	1	0	43
Theft-Auto	7	20	10	24	24	9	2	4	3	7	4	114
Theft-Larceny	44	34	21	21	43	45	31	25	21	39	27	351
Other Crime	**414**	**338**	**372**	**563**	**537**	**428**	**295**	**301**	**270**	**195**	**267**	**3980**
Alcohol	172	178	147	241	216	172	103	112	79	67	178	1665
Drugs	55	42	51	56	78	50	45	43	42	24	12	498
Other Criminal	63	36	37	60	79	77	113	102	99	66	39	771
Public Administrative Order	113	79	103	165	90	92	22	31	38	27	27	787
Violation	2	1	11	32	60	23	7	3	1	1	10	151
Weapons	9	2	23	9	14	14	5	10	11	10	1	108
Traffic	**60**	**75**	**97**	**99**	**86**	**70**	**35**	**46**	**43**	**61**	**24**	**696**
Driving Under the Influence	36	43	45	60	60	48	24	34	27	29	13	419
Driving with Suspended License	5	7	4	12	4	2	0	2	5	10	0	51
Leaving Scene	1	0	0	0	1	0	0	0	0	0	1	3
Motor Vehicle Crash Non-Roadway	2	1	1		1	2	1	2	2	0	2	14
Motor Vehicle Crash Roadway	5	8	11	5	7	9	8	8	4	8	6	79
Other Traffic Infractions	11	16	36	22	13	9	2		5	14	2	130
Grand Total	**1159**	**999**	**1037**	**1448**	**1535**	**1192**	**849**	**875**	**941**	**886**	**823**	**11744**

Table 1 Alaska Trooper Incidents – Bethel Census Area.

Note: 2017 only includes data from January through September.

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017*	Grand Total
Activity	**176**	**169**	**206**	**264**	**282**	**241**	**143**	**138**	**219**	**356**	**270**	**2464**
Deaths Other than Homicide	80	74	88	97	108	111	81	103	96	97	79	1014
Municipal Ordinance Violation				15	11	8						34
Non-Criminal	96	95	118	152	163	122	62	35	123	259	191	1416
Crime Against Person	**977**	**826**	**767**	**1057**	**1193**	**947**	**810**	**859**	**857**	**837**	**643**	**9773**
Assaults	604	490	508	643	824	655	593	575	584	542	485	6503
Harassment	96	106	77	135	122	110	33	54	51	49	33	866
Homicide	8	4	3	7	3	6	8	11	9	9	5	74
Offense Against Minors	26	21	14	34	41	28	16	25	15	10	8	238
Robbery	3	7	1	3		3		2	2	2	4	27
Sexual Assaults	148	115	100	125	113	89	93	115	128	154	69	1249
Sexual Assaults of Minor	92	83	64	110	90	56	67	77	68	71	39	817
Crime Against Property	**532**	**523**	**364**	**452**	**527**	**435**	**355**	**308**	**314**	**326**	**236**	**4372**
Burglary	228	257	173	221	247	170	129	125	149	108	83	1890
Criminal Mischief (Vandalism)	130	103	82	81	116	112	98	66	70	79	63	1000
Financial Crimes	28	17	15	20	9	17	9	4	5	6	1	131
Theft-Auto	40	37	25	48	48	17	9	15	8	22	10	279
Theft-Larceny	106	109	69	82	107	119	110	98	82	111	79	1072
Other Crime	**799**	**692**	**609**	**969**	**992**	**828**	**497**	**529**	**460**	**396**	**406**	**7177**
Alcohol	313	264	203	361	337	282	143	165	117	111	200	2496
Drugs	82	47	66	80	99	85	62	52	46	26	21	666
Other Criminal	163	123	84	136	161	160	214	218	202	174	114	1749
Public Administrative Order	209	225	202	314	298	244	49	66	69	70	49	1795
Violation	2	1	11	35	62	29	10	7	2	1	11	171
Weapons	30	32	43	43	35	28	19	21	24	14	11	300
Traffic	**255**	**253**	**284**	**305**	**260**	**230**	**148**	**185**	**144**	**157**	**73**	**2294**
Driving Under the Influence	79	76	73	106	120	103	74	74	59	50	26	840
Driving with Suspended License	27	16	19	21	13	7	7	14	15	25		164
Leaving Scene	6	5	1		2	2	1	2	2	2	2	25
Motor Vehicle Crash Non-Roadway	5	4	6	4	8	9	8	7	4	4	5	64
Motor Vehicle Crash Roadway	74	97	83	83	67	72	55	80	53	59	34	757
Other Traffic Infractions	64	55	102	91	50	37	3	8	11	17	6	445
Grand Total	**2739**	**2463**	**2230**	**3047**	**3254**	**2681**	**1953**	**2019**	**1994**	**2072**	**1628**	**26080**

Table 2 Alaska Trooper Incidents – Bethel, Kusilvak, and Yukon-Koyukuk Census Areas combined

Note: 2017 only includes data from January through September.

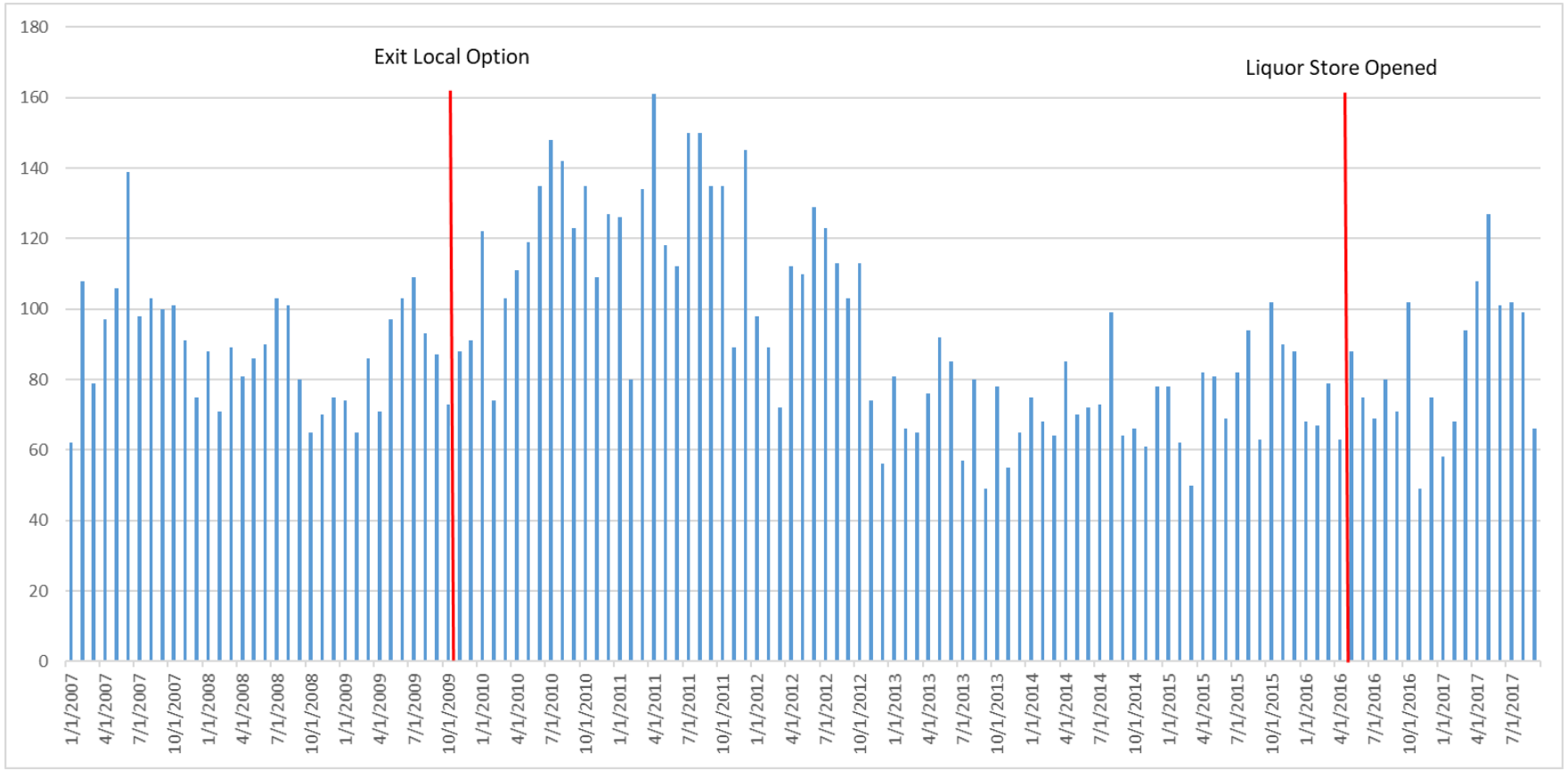


Figure 28 Total Trooper Incidents by month, Bethel census area

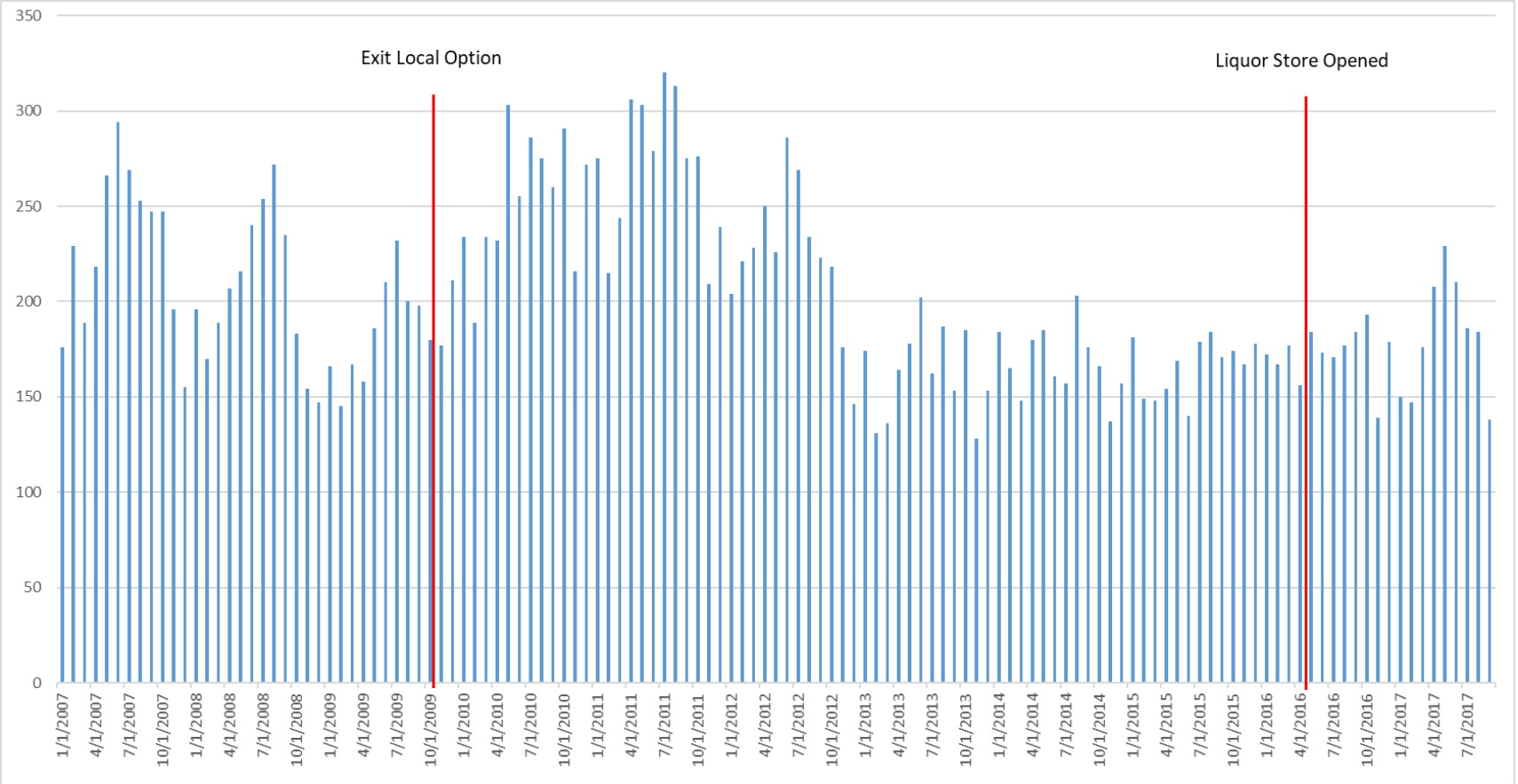


Figure 29 Total Trooper Incidents by month, all three census areas

All Incidents Combined

We used regression analysis to evaluate the effect of the decision to leave local option and of the opening of the liquor store on the total monthly volume of Alaska State Trooper Incidents in the Bethel census area and the three census areas, taking into consideration seasonality and trends over time. Our modeling efforts identified seasonal effects with the highest incident volumes in the summer (May through August) and the lowest in November. We also identified a small but constant month-to-month decrease across the entire study. On top of those changes, we found that after Bethel left local option, monthly incident counts in the Bethel census area were 66% higher than would otherwise been expected (beta coefficient = 0.508, $p < 0.001$). With the opening of the liquor store, monthly incidents counts rose another 31% (beta coefficient = 0.272, $p < 0.001$). Figure 30 shows the actual vs predicted for total monthly incident counts in the Bethel Census areas for January 2007 through September 2017.

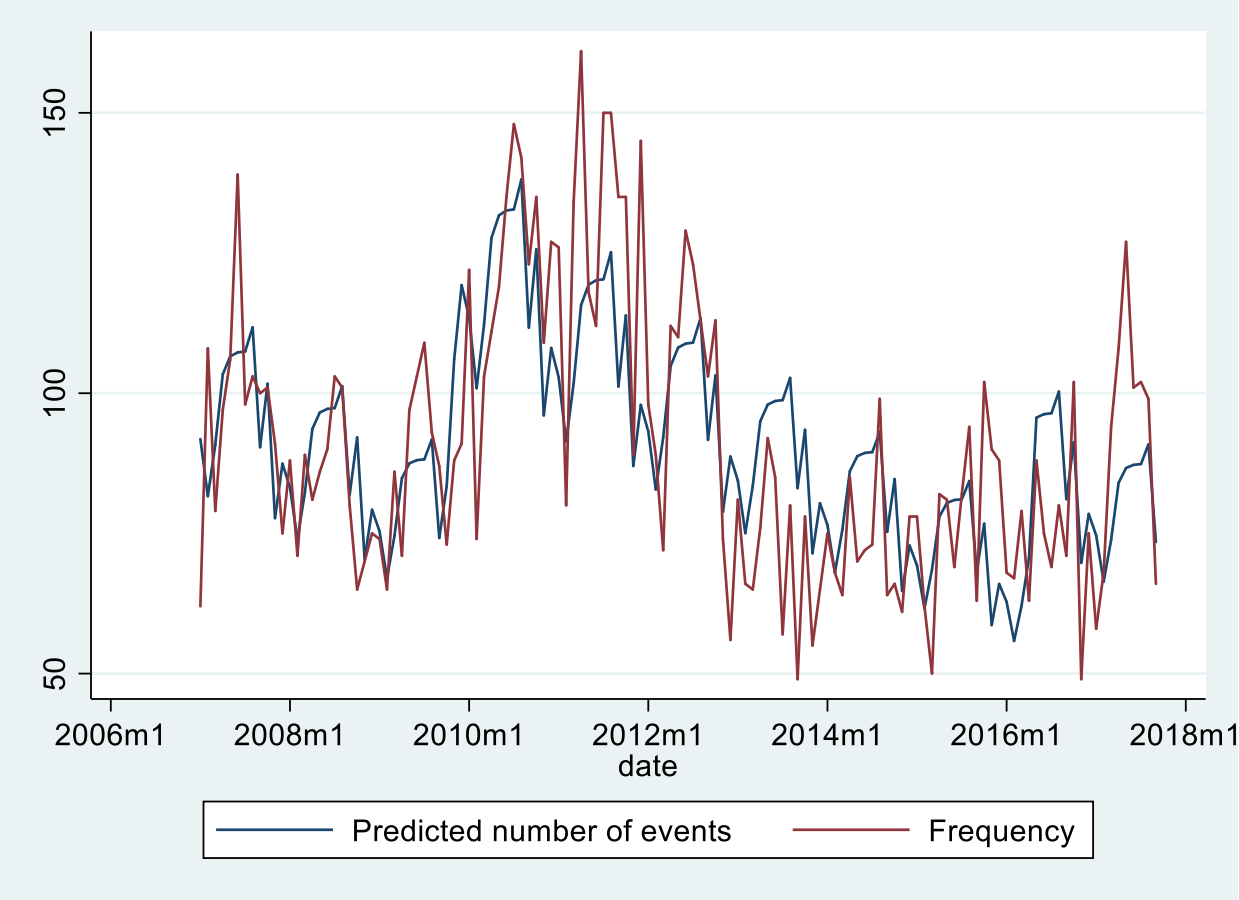


Figure 30 Actual vs predicted total monthly incident counts, Bethel census areas

Findings were similar across the three census areas combined with both seasonal variation and a small but constant month-to-month decrease over time. Across the three census areas, we found that after Bethel left local option, monthly incident counts were 54% higher than would otherwise been expected (beta coefficient = 0.434, $p < 0.001$), with most of this increase between 2010 and 2012. With the opening of the liquor store, monthly incidents counts rose another 23% (beta coefficient = 0.210, $p < 0.001$). Figure 31 shows the actual vs predicted for total monthly incident counts for January 2007 through September 2017 for the three census areas combined.

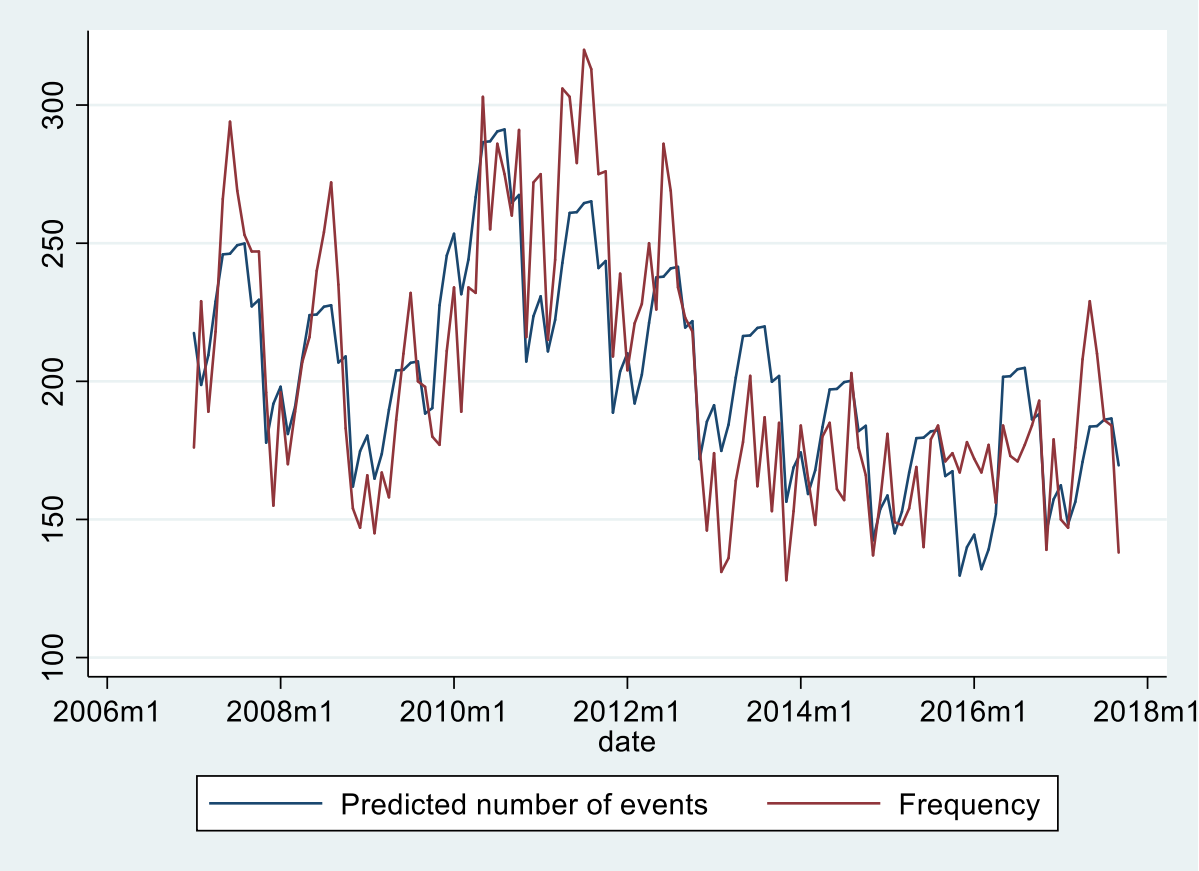


Figure 31 Actual vs predicted total monthly incident counts, all three census areas

Driving Under the Influence

Between January 2007 and September 2017 there were 840 DUI incidents, including one DUI refusal, with 419 in the Bethel Census area, 215 in Kusilvak, and 206 in Yukon-Koyukuk. The column chart in Figure 32 shows the frequency of DUI incidents per month in the Bethel census area and Figure 33 shows the same information across the three census areas combined. The red lines indicate when Bethel left local option (November 2009) and when the AC liquor store opened (May 2016).

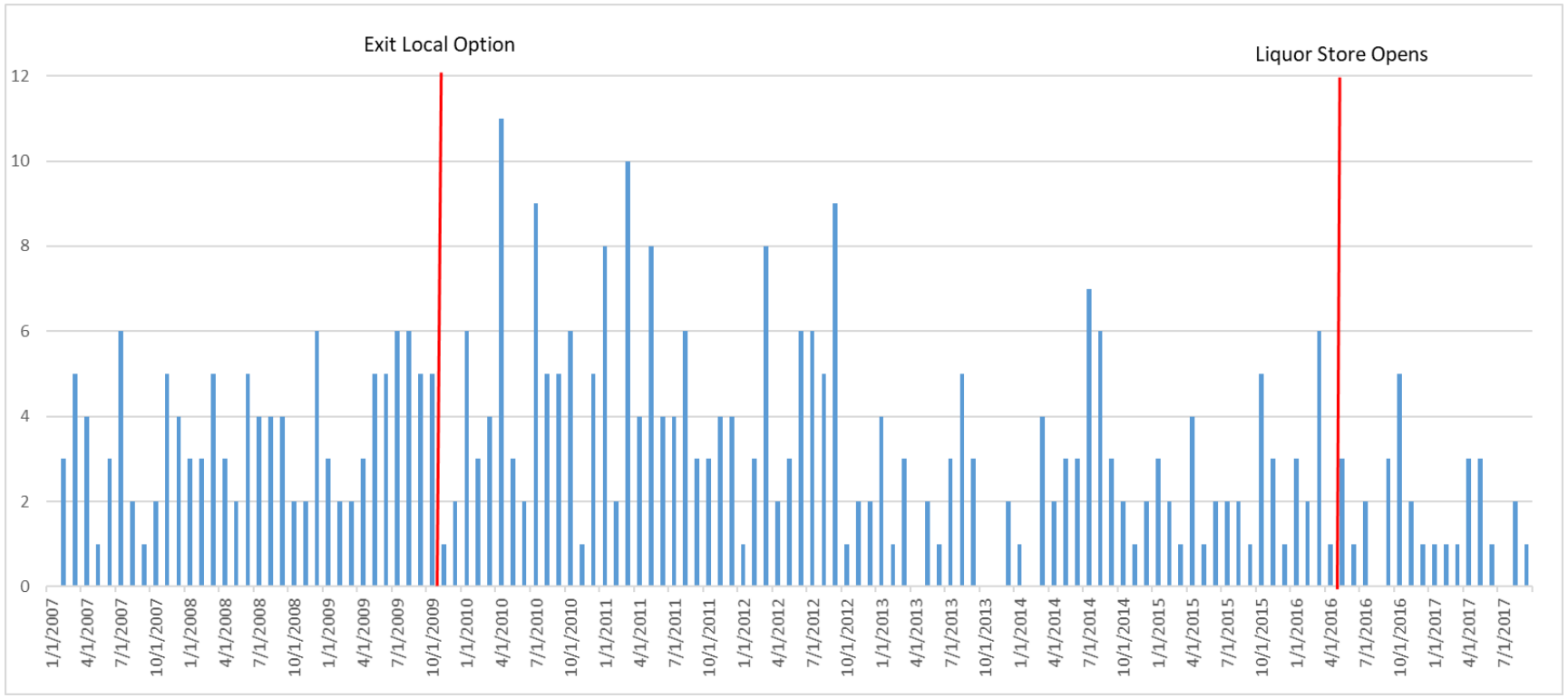


Figure 32 DUI incident counts by month, Bethel census area

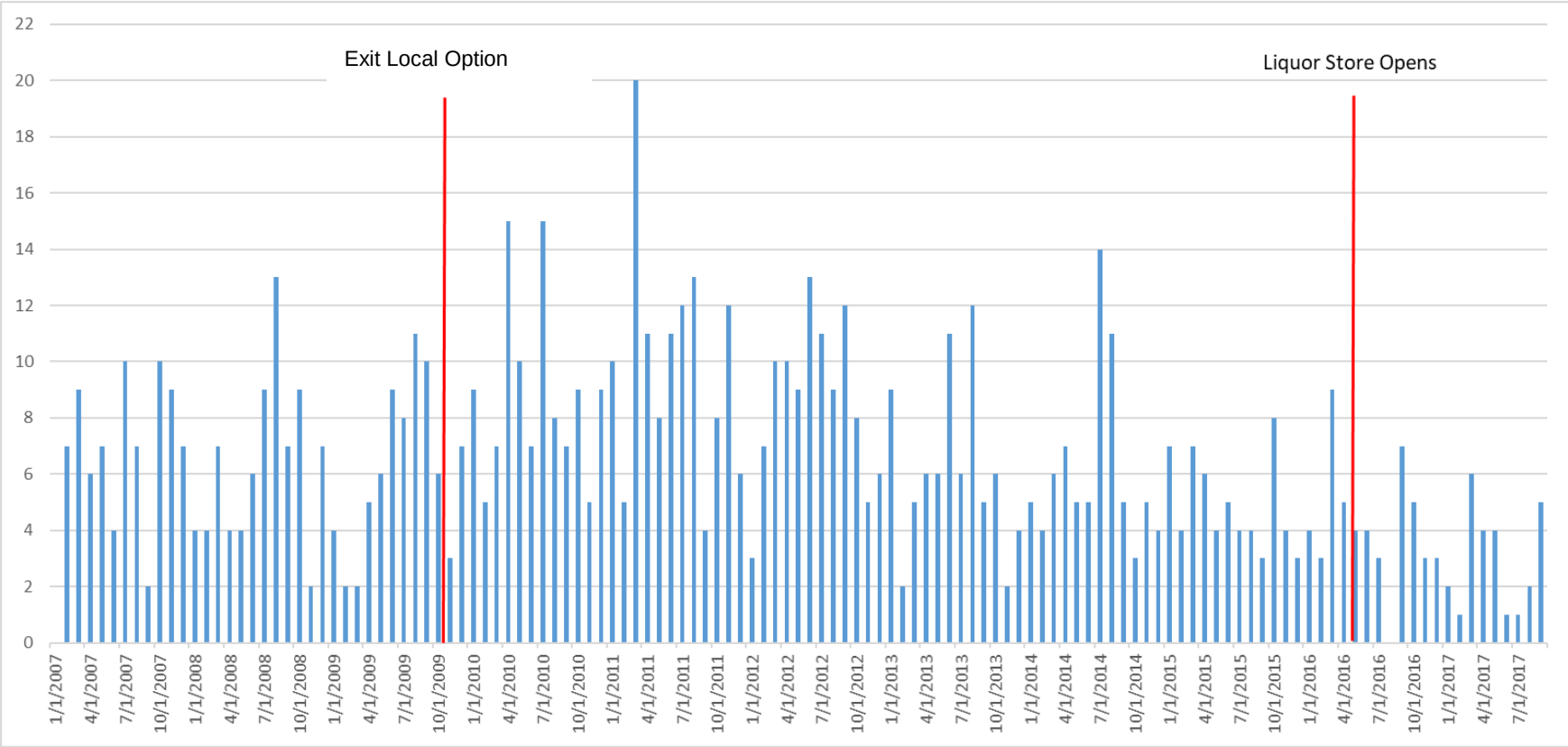


Figure 33 DUI incident counts by month, all three census areas combined

Regression analysis taking into consideration seasonality and a small but statistically significant steady decrease over time, found that the monthly volume of DUI incidents in the Bethel census area was 67% higher following Bethel's exit from local option (beta coefficient = 0.511, p = 0.003). No further change occurred with the opening of the liquor store. Figure 34 shows the actual and predicted DUI incident volume by month based on this multivariable model for the Bethel census area.

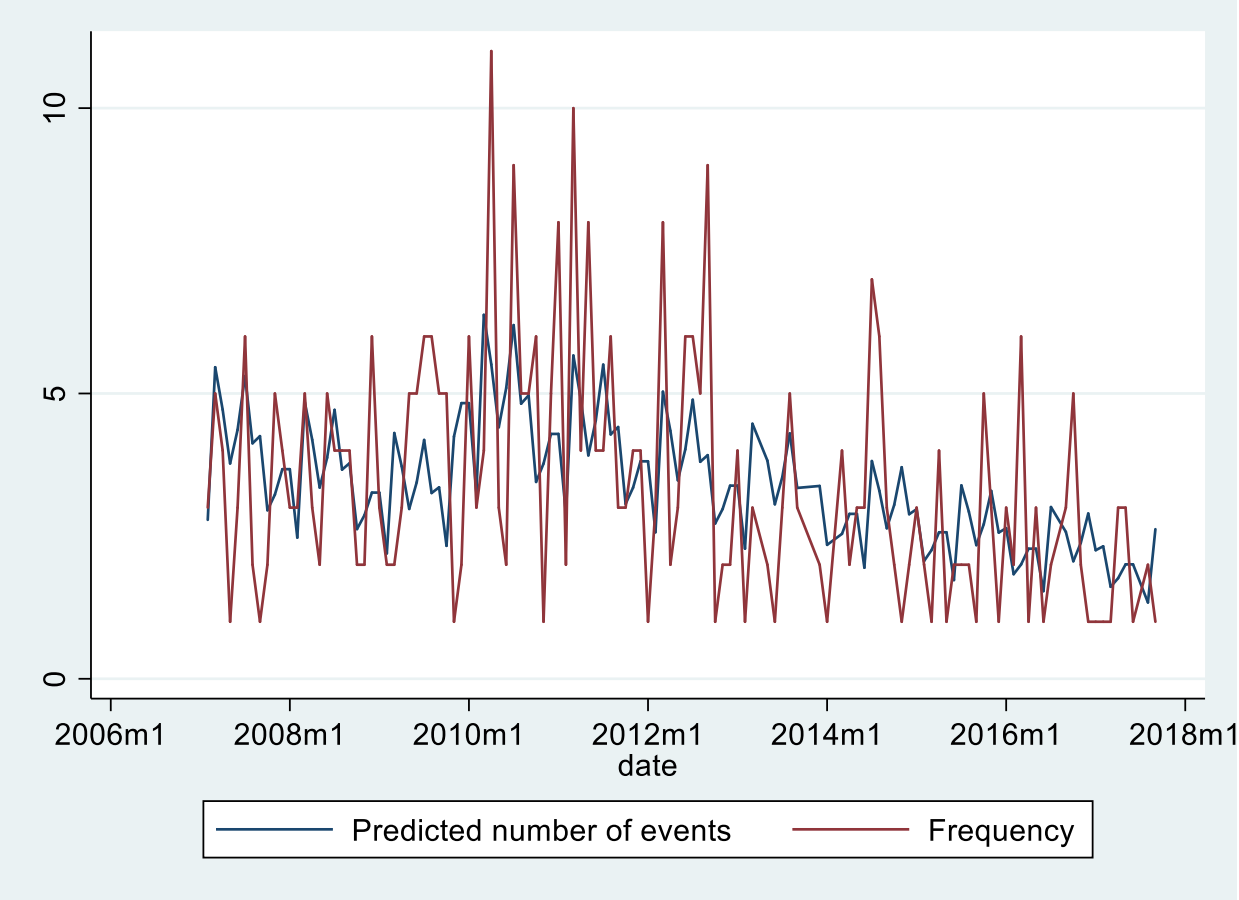


Figure 34 Actual vs predicted DUI incidents, Bethel census area

We found a similar pattern in terms of seasonality and a small but steady decrease over time when looking at DUI incidents across all three census areas combined. Again, modeling data from the three census areas combined, we found that the monthly volume of DUI incidents was 90% higher than expected following Bethel's exit from local option (beta coefficient = 0.640, p < 0.001), while the presence of the liquor store was associated with a 30% lower volume of DUI incidents (beta coefficient = -0.354, p = 0.021). Figure 35 shows the actual and predicted DUI incident volume by month based on this multivariable model.

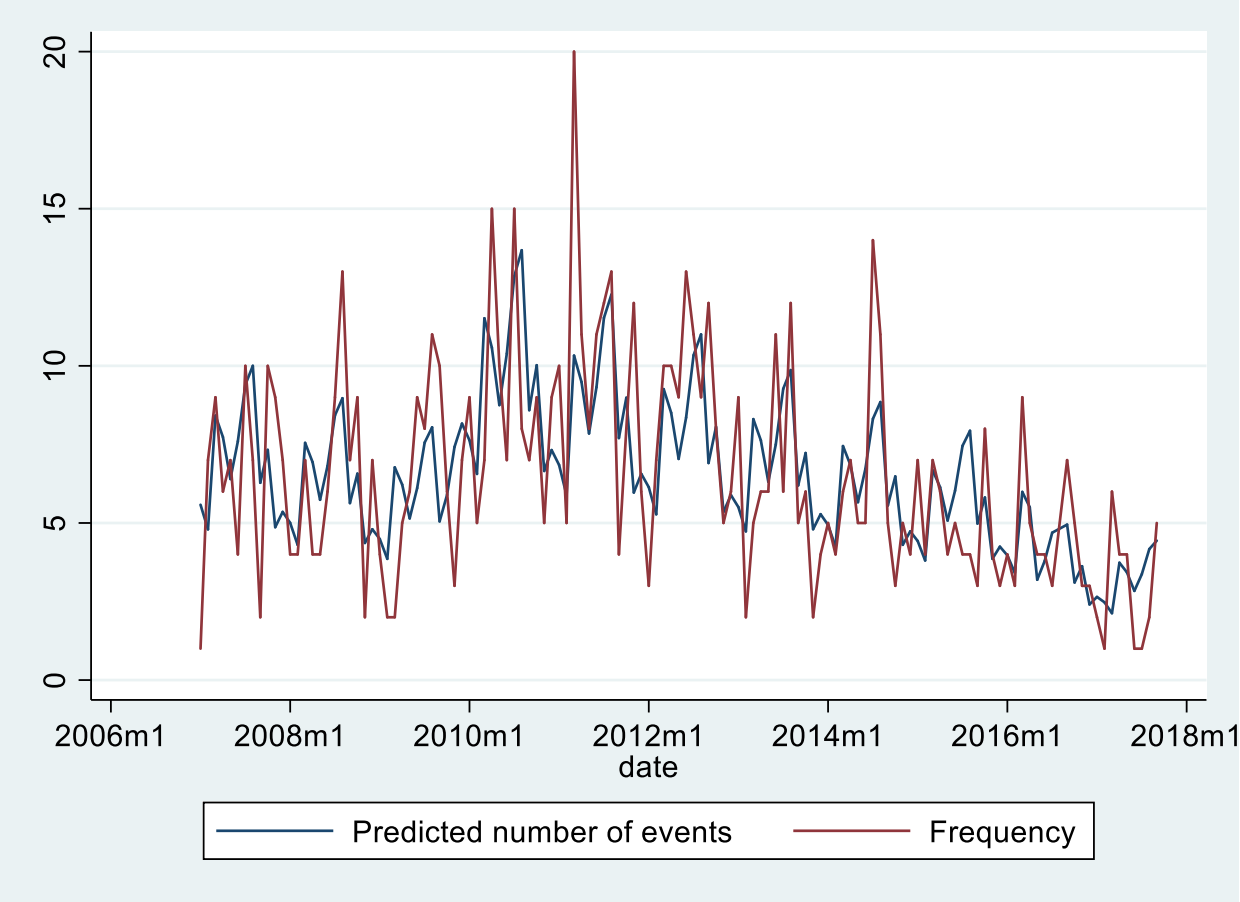


Figure 35 Actual vs predicted DUI incident counts, all three census areas

Alcohol Crimes

Overall 9.6% of all incidents were identified as alcohol crimes such as possession or transport of alcohol - with the highest percentage of alcohol crimes, 12.3%, in 2017 and the lowest, 5.4%, in 2016. In the Bethel census area, 14.2% of all incidents were for alcohol crimes, also with the highest percentage, 21.6%, in 2017 and the lowest, 7.6%, in 2016.

The column chart in Figure 36 shows the frequency of incidents for alcohol crimes per month in the Bethel census area, with the red lines indicating when Bethel left local option (November 2009) and when the AC liquor store opened (May 2016). Figure 37 shows the frequency of incidents for alcohol crimes per month in the three census areas combined. The two figures show similar trends with the volume of alcohol crimes incidents relatively constant in the two years before and three years after leaving local option and then appearing to decrease in the three years before through first ten months after the liquor store opened before returning to the previous higher level.

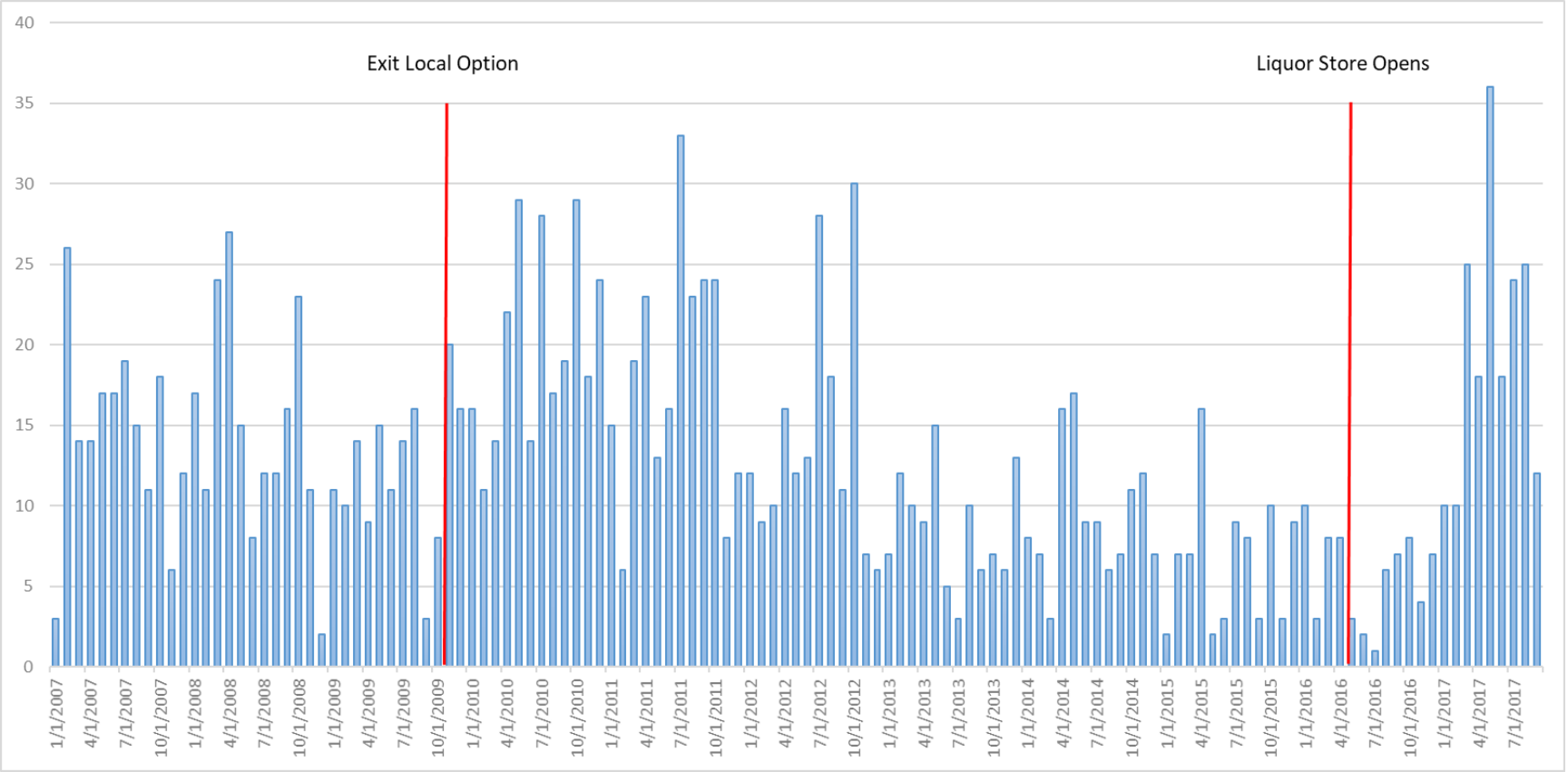


Figure 36 Alcohol crime incident counts, Bethel census area only

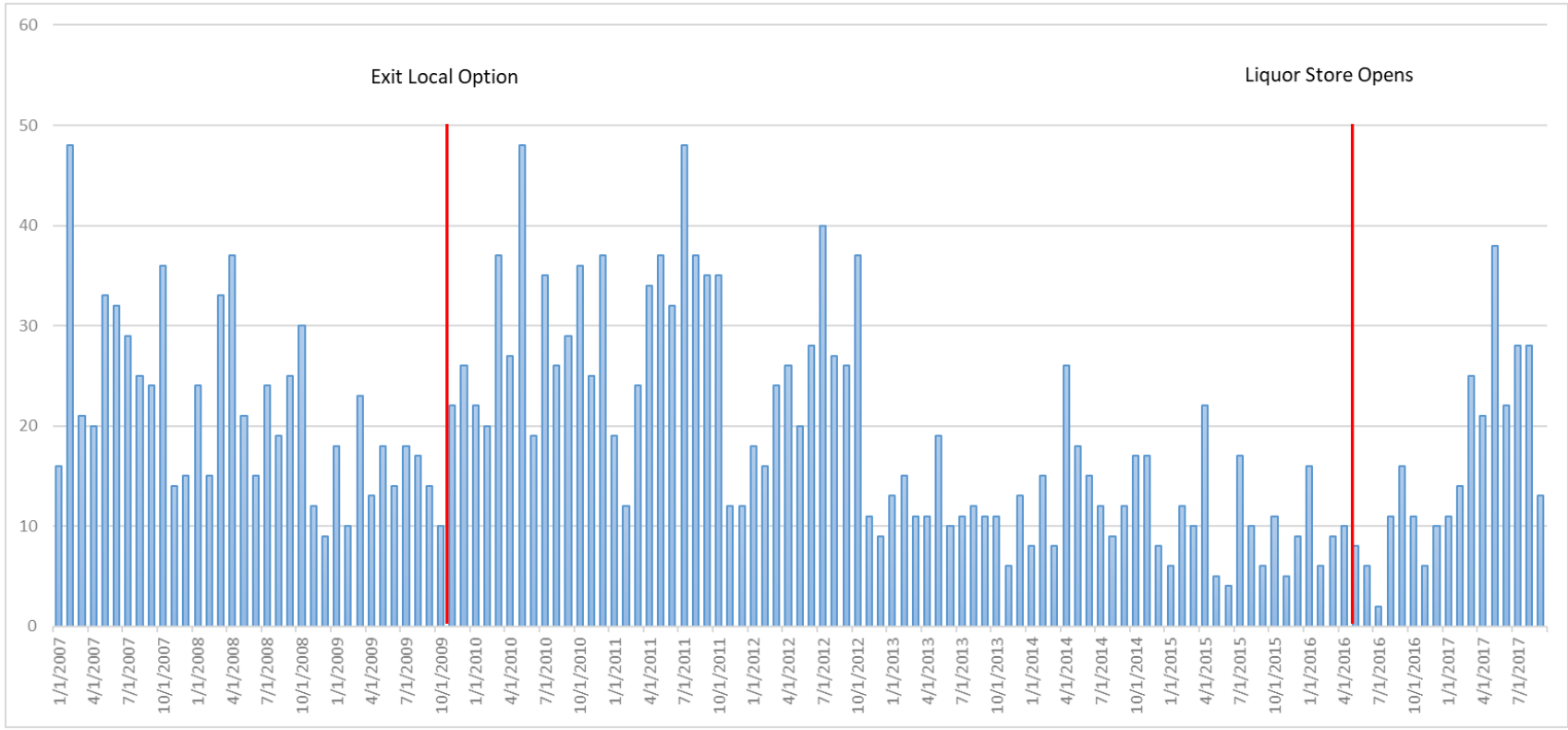


Figure 37 Alcohol Crime Incident Counts, all three census areas

After adjusting for seasonality and a small steady decrease over time, regression analysis indicates that alcohol crimes in the Bethel census area were approximately 2.2 time higher after Bethel left local option and 5 times higher after the liquor store opened. Figure 38 shows the actual vs predict alcohol crime volume for the Bethel census area. While the model fits the data well overall, if you look carefully you can see that it does not quite capture the time lag in increased alcohol crimes in Bethel after the liquor store opened.

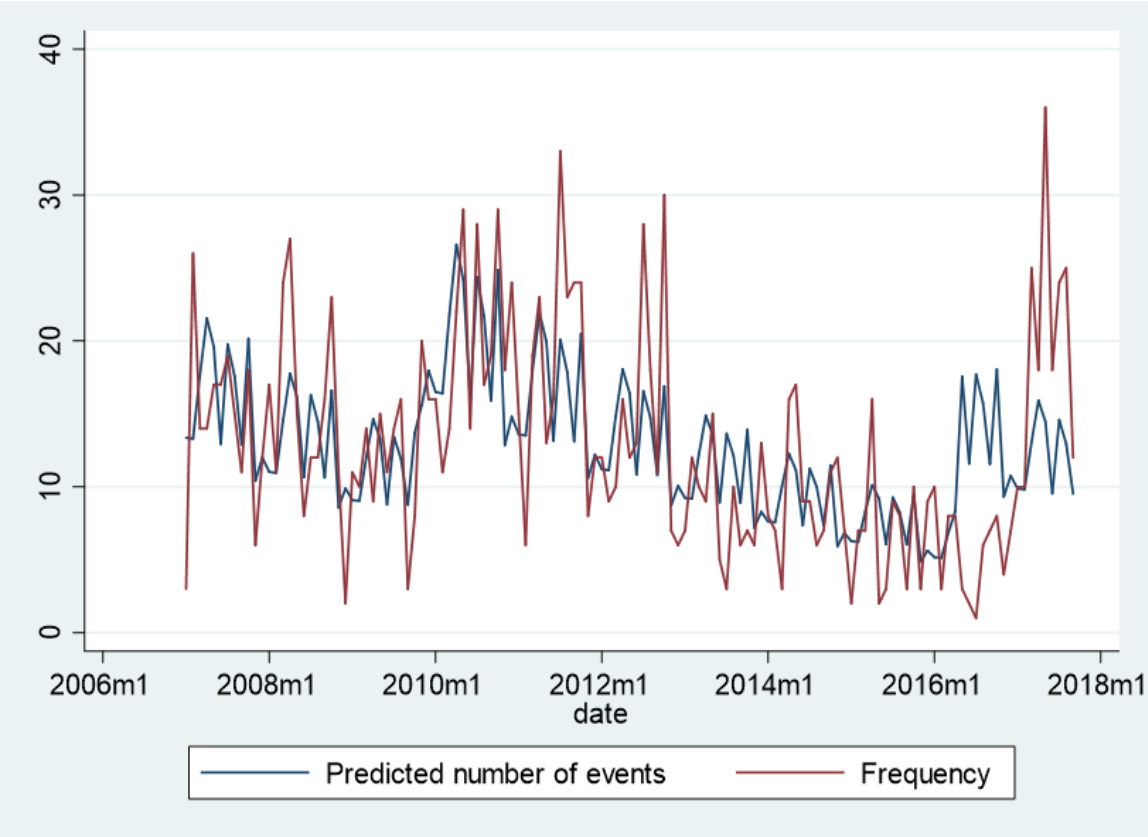


Figure 38 Alcohol Crimes actual vs predicted, Bethel census area only

Results were similar when looking across the three census areas combined with alcohol crimes 2.4 times higher after the vote and 2.1 times higher when the store was open ($p < 0.001$ for both multivariable regression models). Figure 39 shows the actual vs predict alcohol crime volume for the three census areas combined.

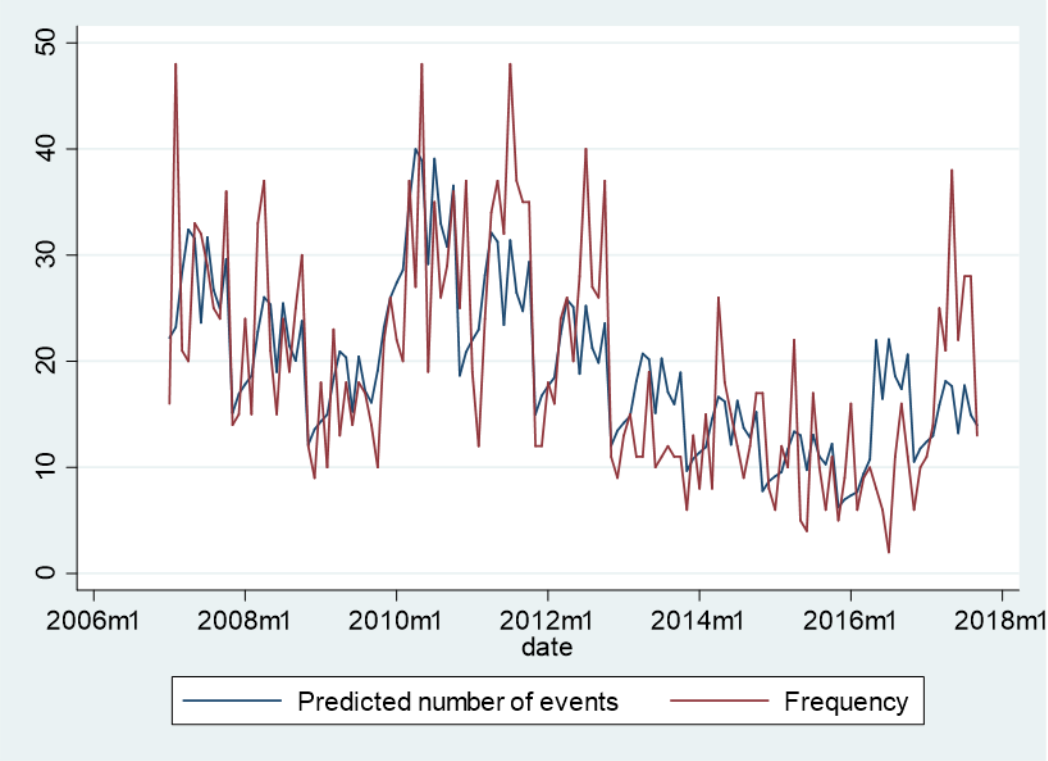


Figure 39 Alcohol Crimes actual vs predicted, all three census areas

Assault

Approximately two-thirds of the crimes against people from January 2007 through September 2017 were assaults. In the Bethel Census areas, the highest assault incidence, 369, occurred in 2011 and the lowest, 198, occurred in 2008. The column chart in Figure 40 shows the assault incident volume by month for the Bethel census area and Figure 41 shows the same information for the three census areas combined.

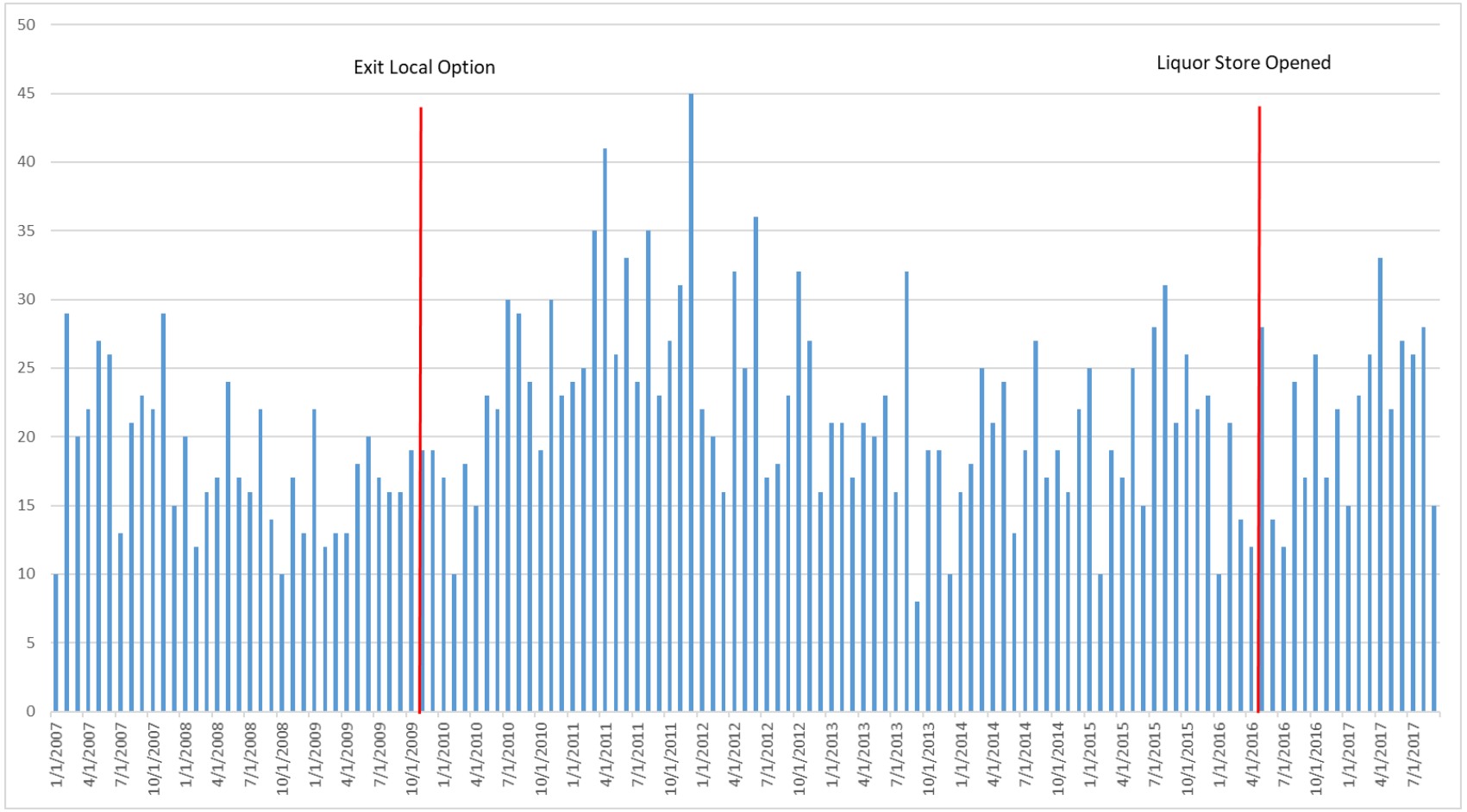


Figure 40 Bethel Assault incidents by month, Bethel census area only

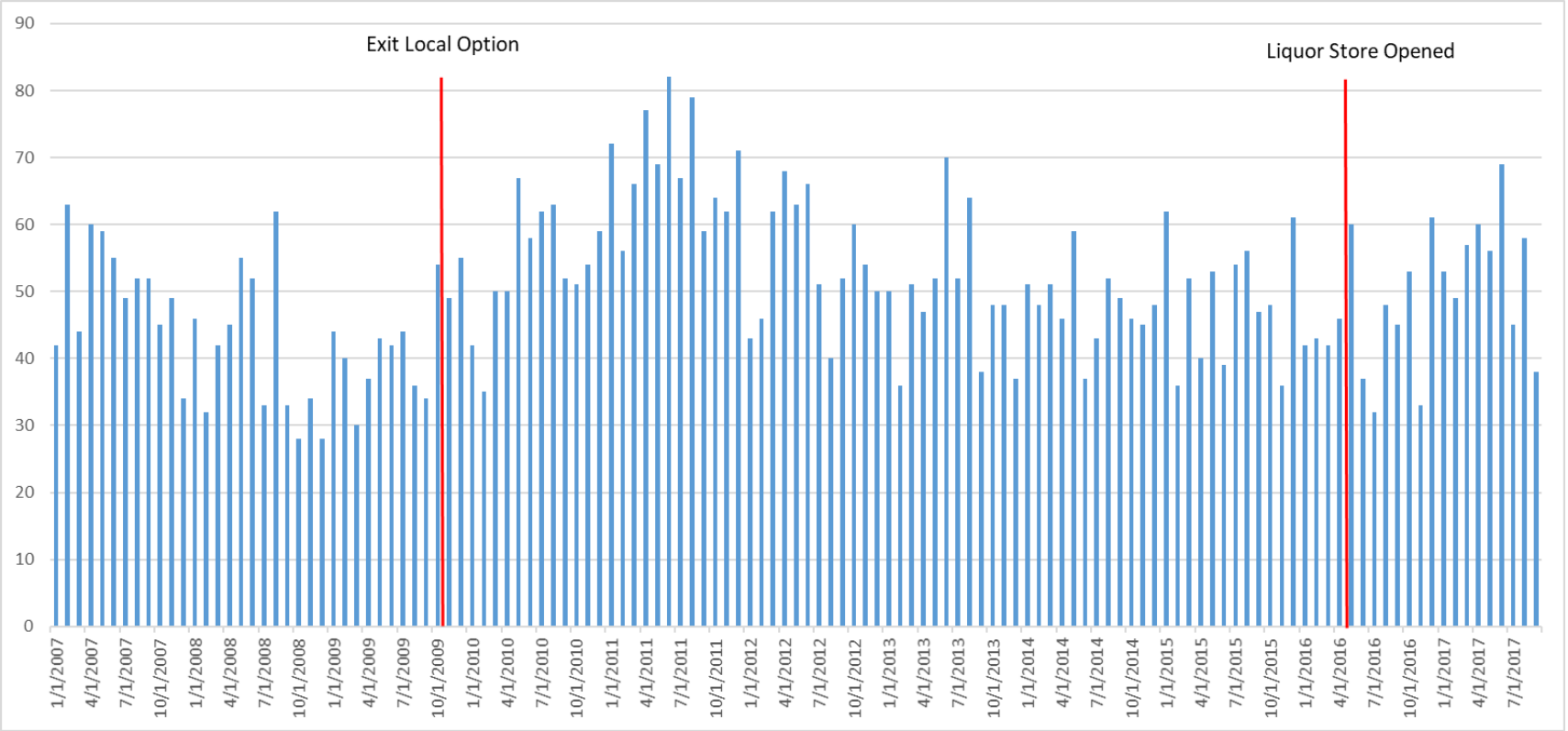


Figure 41 Assault incidents by month, all three census areas

After adjusting for seasonality and a small but statistically significant decrease over time, the monthly assault incident count in the Bethel census areas was approximately 50% higher after Bethel left local option (beta coefficient = 0.432, p < 0.001), and an additional 20% higher after the liquor store opened (beta coefficient = 0.181, p = 0.057). Figure 42 shows the actual vs predicted monthly assault counts for the Bethel census area.

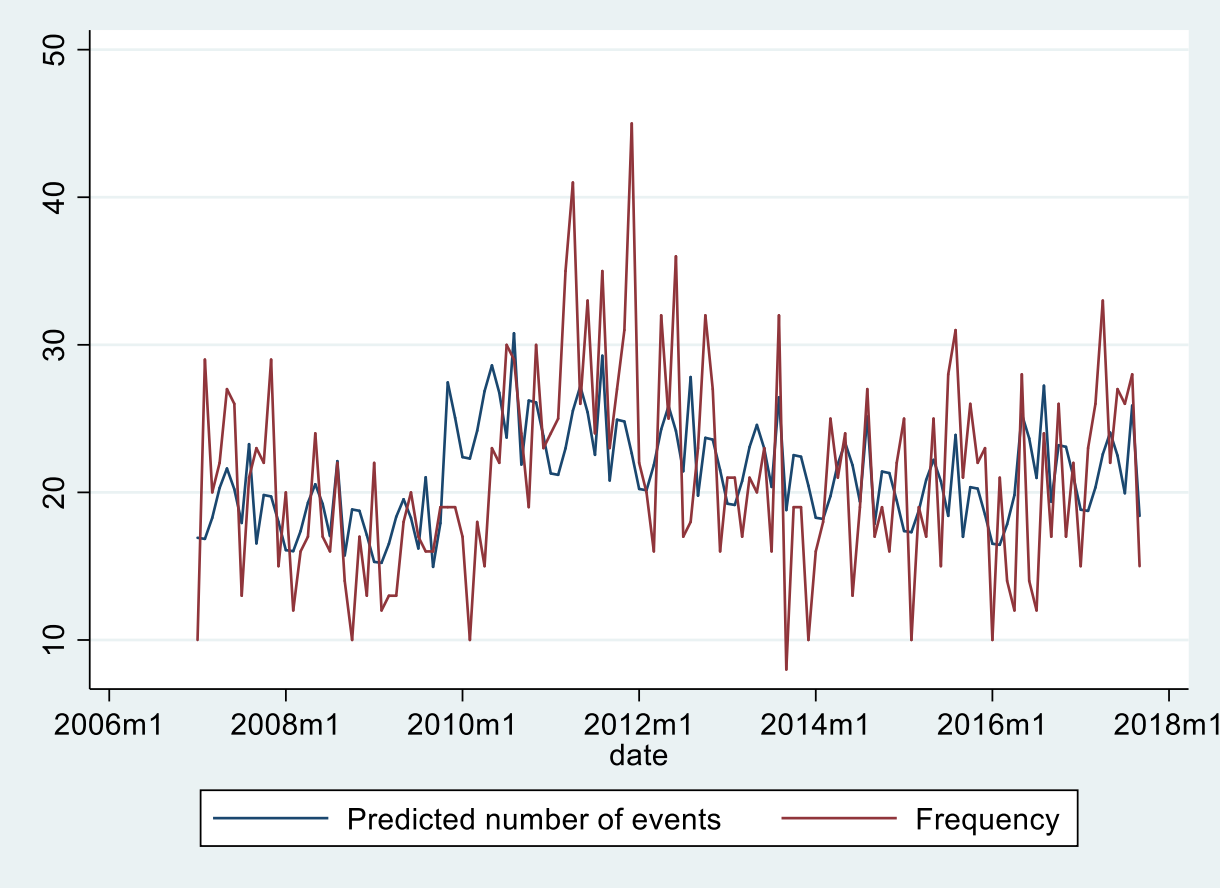


Figure 42 Actual vs predicted assaults, Bethel census area

The association between assault and leaving local option was similar when considering data from the three census areas combined, approximately 50% higher after Bethel withdrew from local option (beta coefficient = 0.425, p < 0.001), and an additional 10% higher after the liquor store opened (beta coefficient = 0.126, p = 0.046). Figure 43 shows the actual vs predicted monthly assault counts for the three census areas combined.

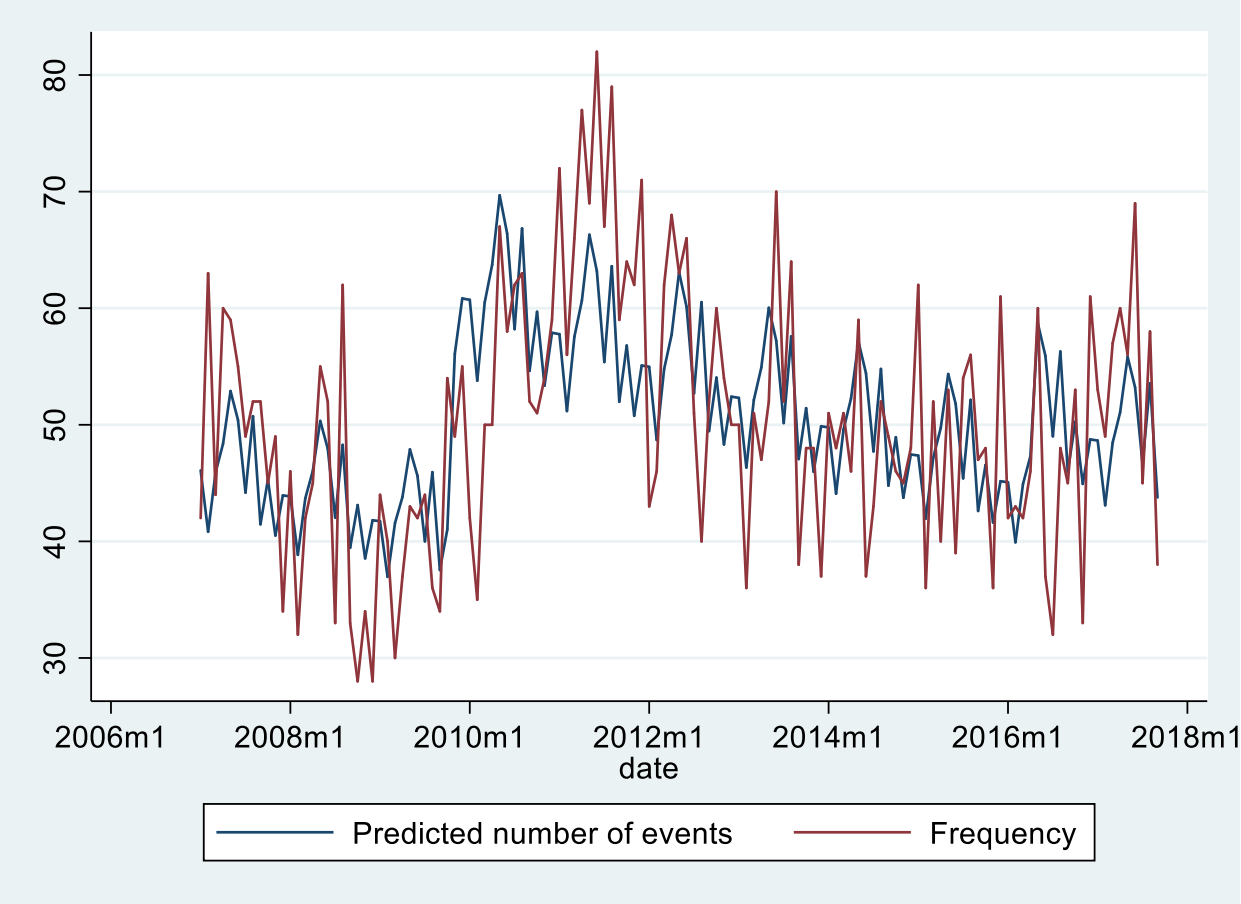


Figure 43 Actual vs predicted assaults by month, all three census areas

Sexual Assault

Close to 13% of crimes against people in the three census areas combined from January 2007 through September 2017 were sexual assault incidents. During this time period, there were 568 sexual assault incidents in the Bethel census area, 498 in the Kusilvak census area, and 183 in the Yukon-Koyukuk census area. Figure 44 shows the distribution of sexual assault incidents over time in the Bethel census area combined and Figure 45 shows the same information for the three census areas combined.

In the Bethel census area, after adjusting for seasonality, the volume of sexual assault incidents by month was approximately 44% higher after the liquor store opened (beta coefficient = 0.367, p = 0.002). There was no association between sexual assault incidents and leaving local option. Figure 46 shows the actual vs predicted sexual assault counts by month in the Bethel census area. Visual inspection of Figure 44 and Figure 45 suggest that the increase in sexual assault may have started before the liquor store opened, but well after Bethel exited local option. When analyzing data from all three census areas combined, regression analysis found no association between sexual assault incident counts and either leaving local option or the liquor store status.

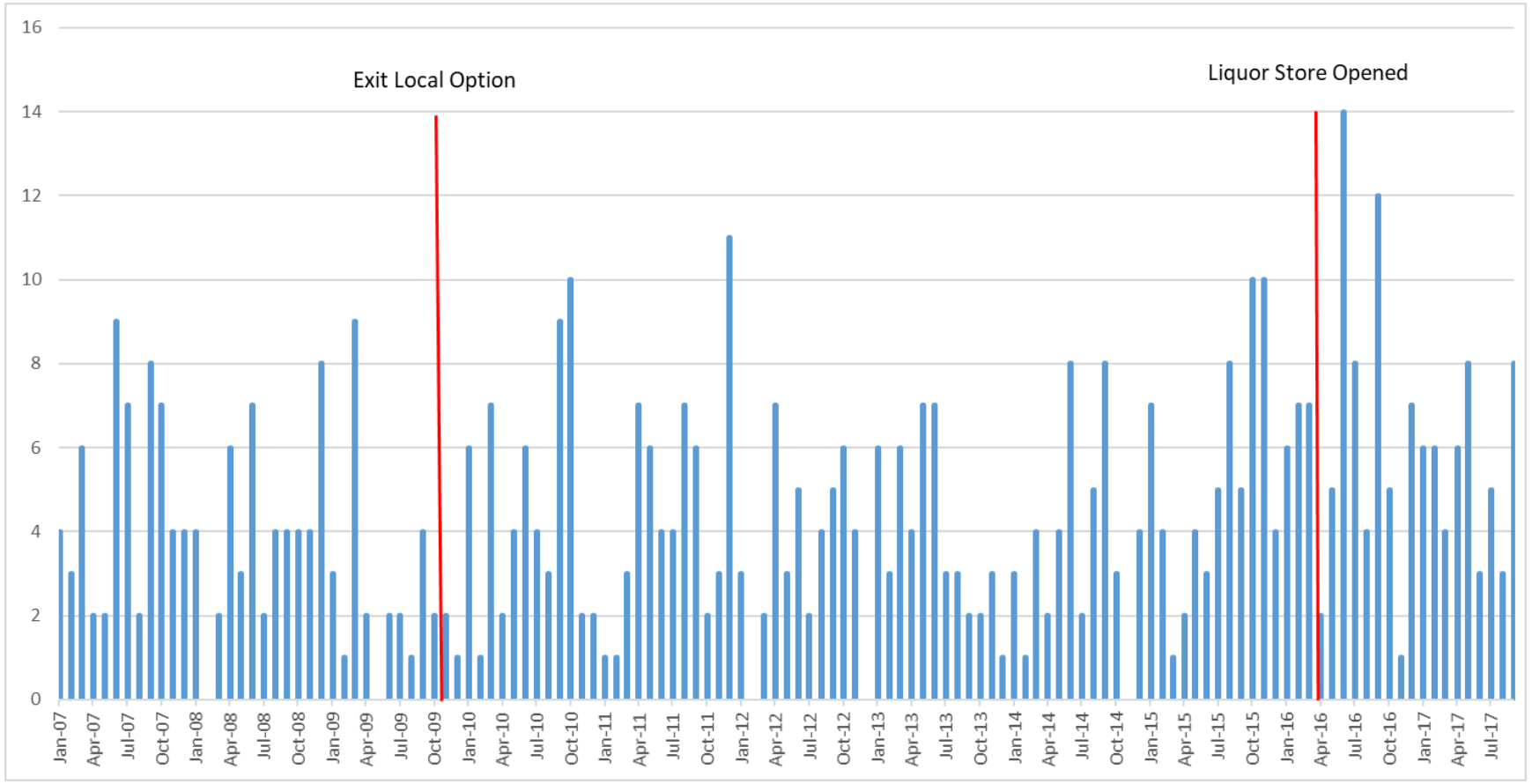


Figure 44 Sexual assault incident count by month, Bethel Census area

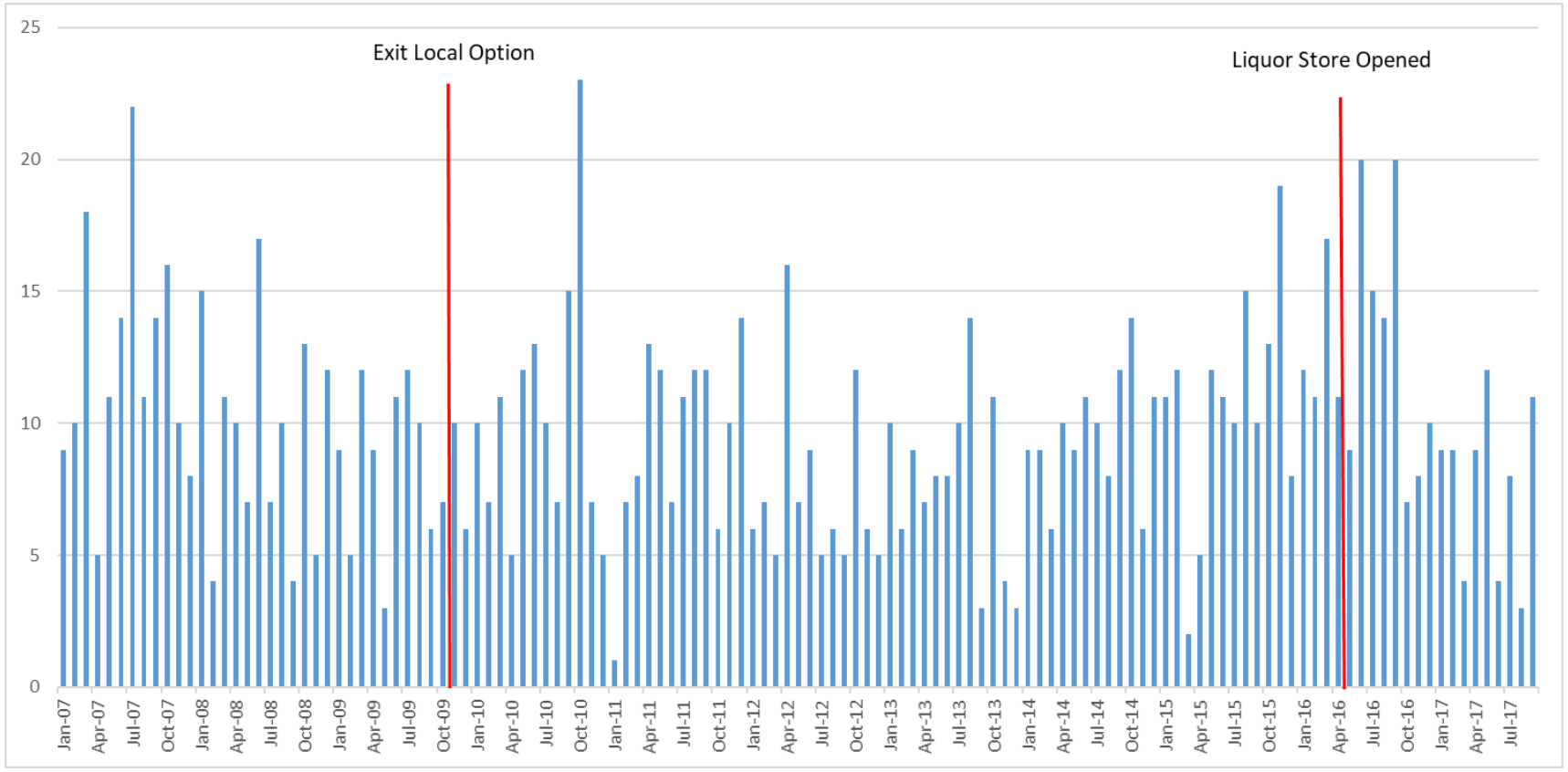


Figure 45 Sexual assault incidents per month, all three census areas

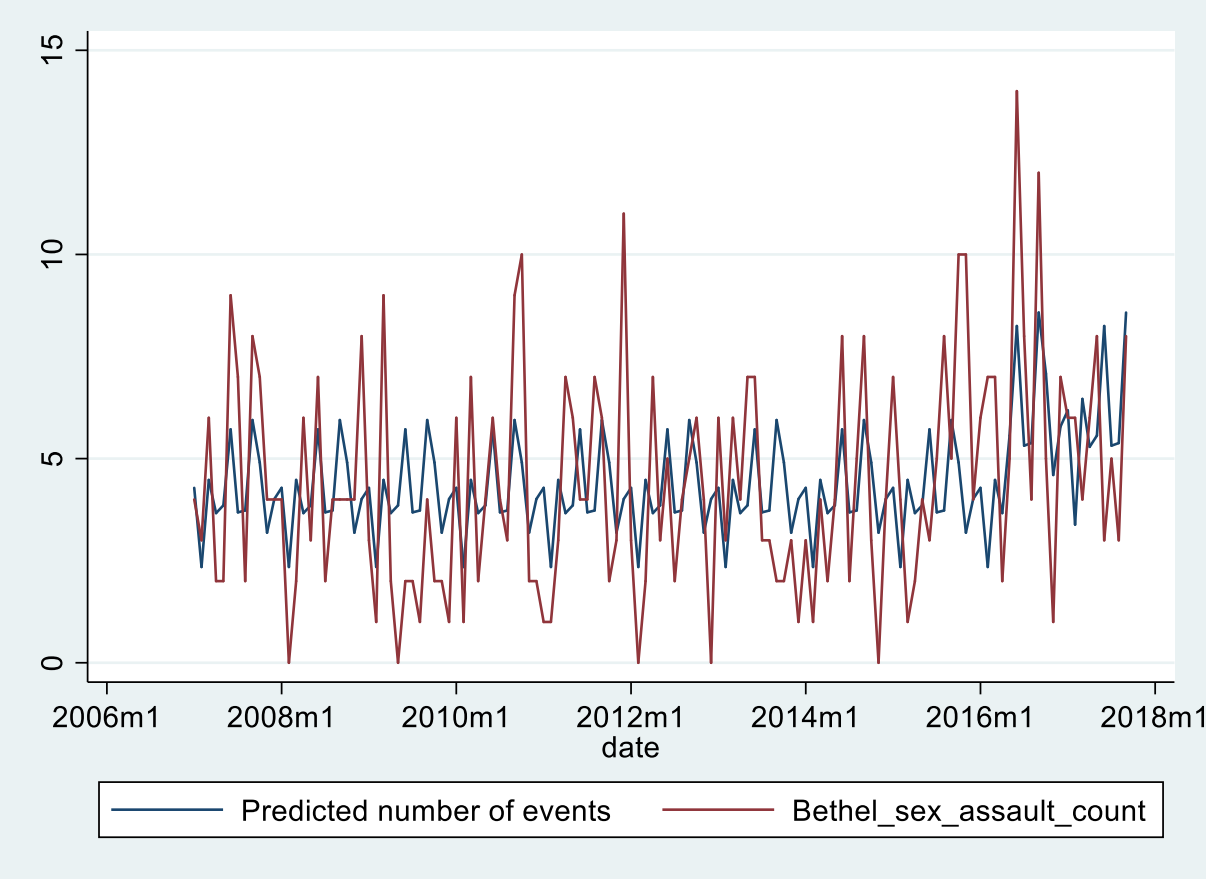


Figure 46 Actual vs predicted sexual assault incident by month, Bethel census area

Deaths Other Than Homicide

Between January 2007 and September 2017, there were 1014 deaths other than homicide in the three census areas – 450 in the Bethel census area, 331 in the Kusilvak census area, and 233 in the Yukon-Koyukuk census area. Figure 47 shows the distribution of deaths other than homicides over time in the Bethel census area and Figure 48 shows the same information for the three census areas combined. Visually the frequency of deaths other than homicide over time looks relatively constant both for the Bethel census area and the three census areas combined.

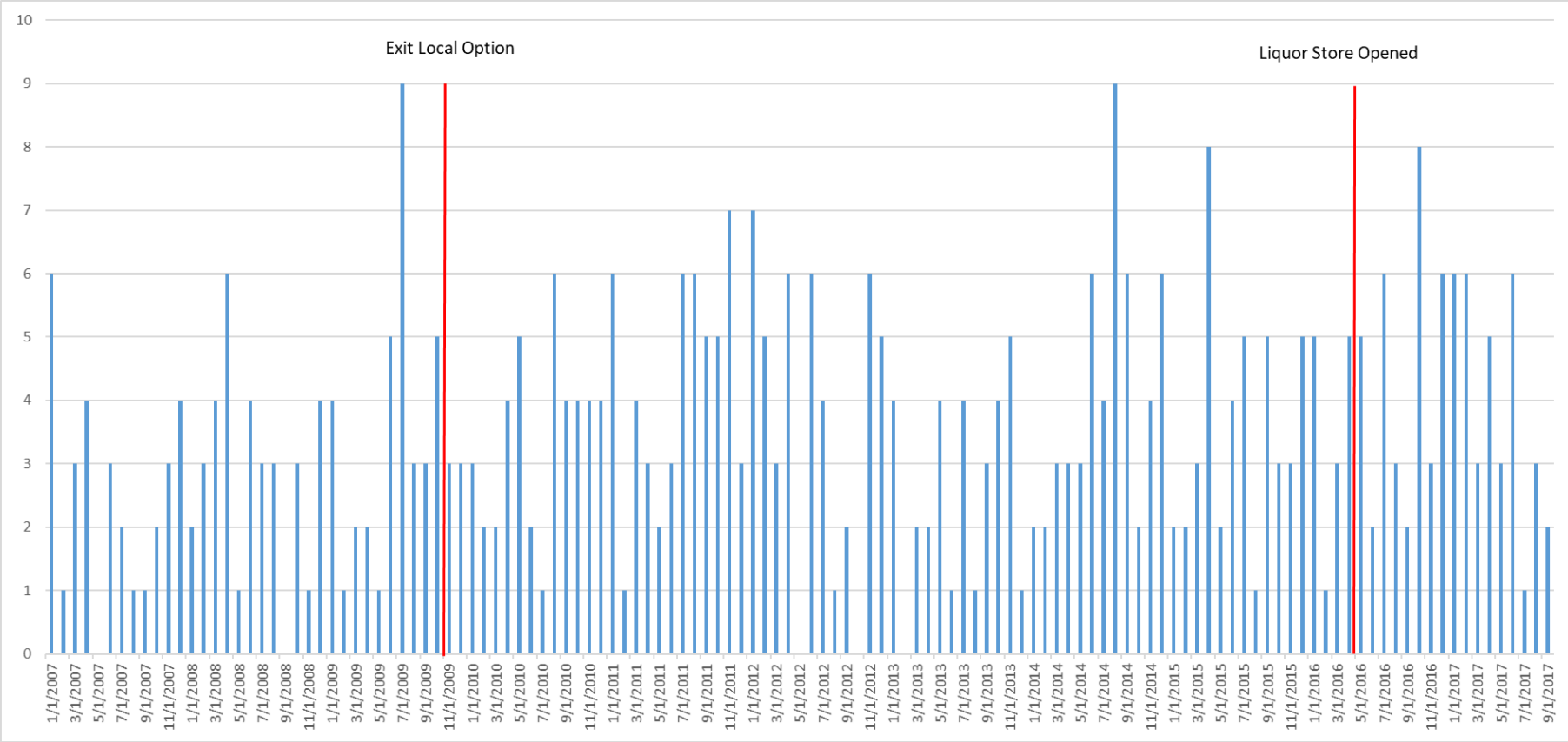


Figure 47 Deaths other than homicide by month, Bethel census area

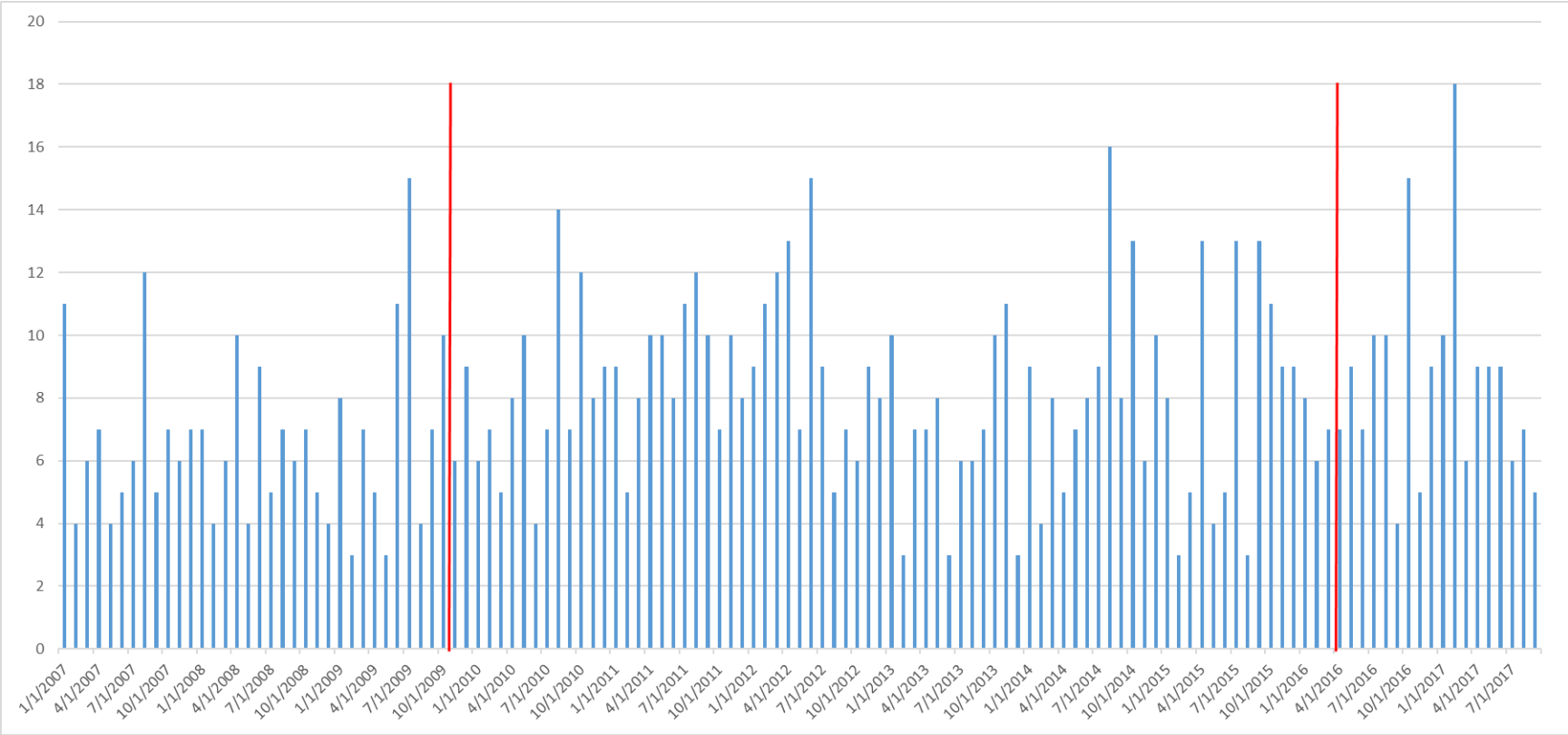


Figure 48 Deaths other than homicide by month, all three census areas

In the Bethel census are, after adjusting for seasonality frequency of deaths other than homicides was approximately 26% higher in the months after Bethel left local option (beta coefficient = 0.231, p = 0.034). Figure 49 shows the actual vs predicted monthly counts for deaths other than homicide for the Bethel census area. There was no association between deaths other than homicide and the liquor store being open. Results were similar when the analysis included data from the three census areas combined with deaths other than homicides approximately 25% higher in the months after Bethel left local option (beta coefficient = 0.222, p = 0.002). Again, there was no association between deaths other than homicide and the liquor store being open. Figure 50 shows the actual vs predicted monthly counts for deaths other than homicide for the three census areas combined.

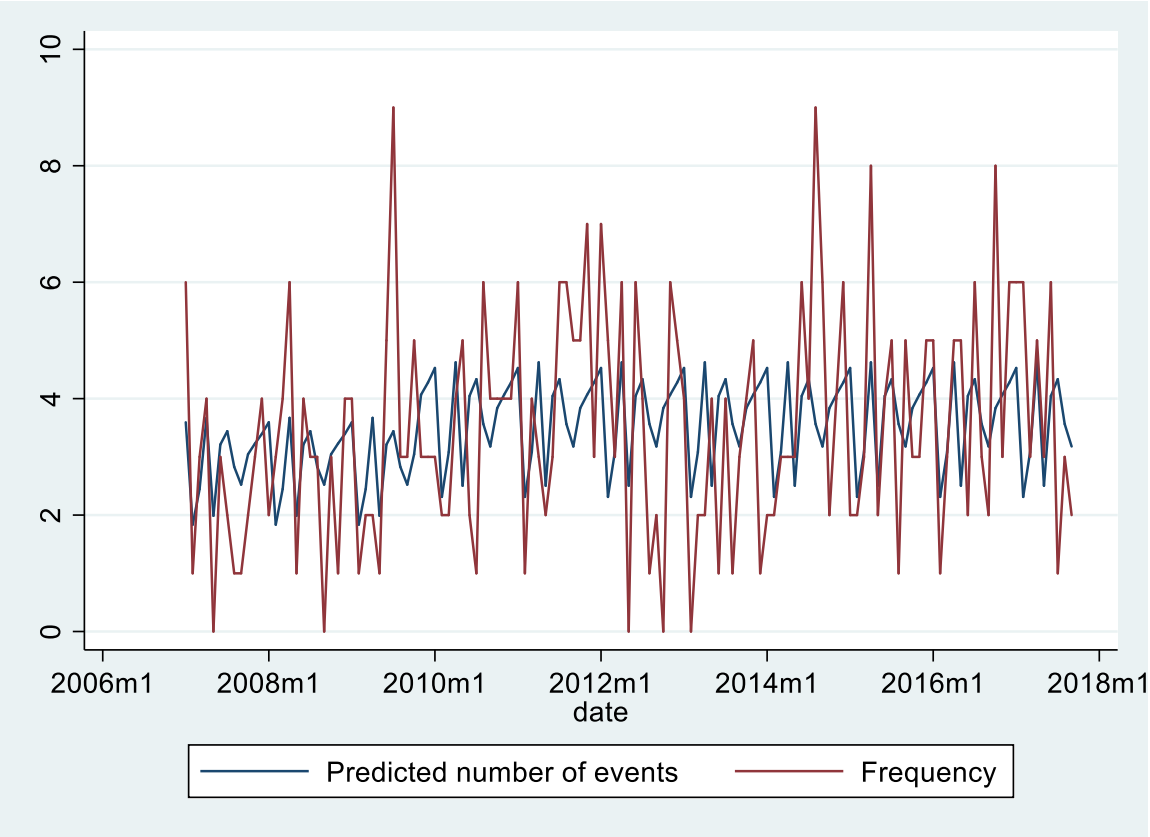


Figure 49 Actual vs predicted Deaths Other Than Homicide, Bethel census area

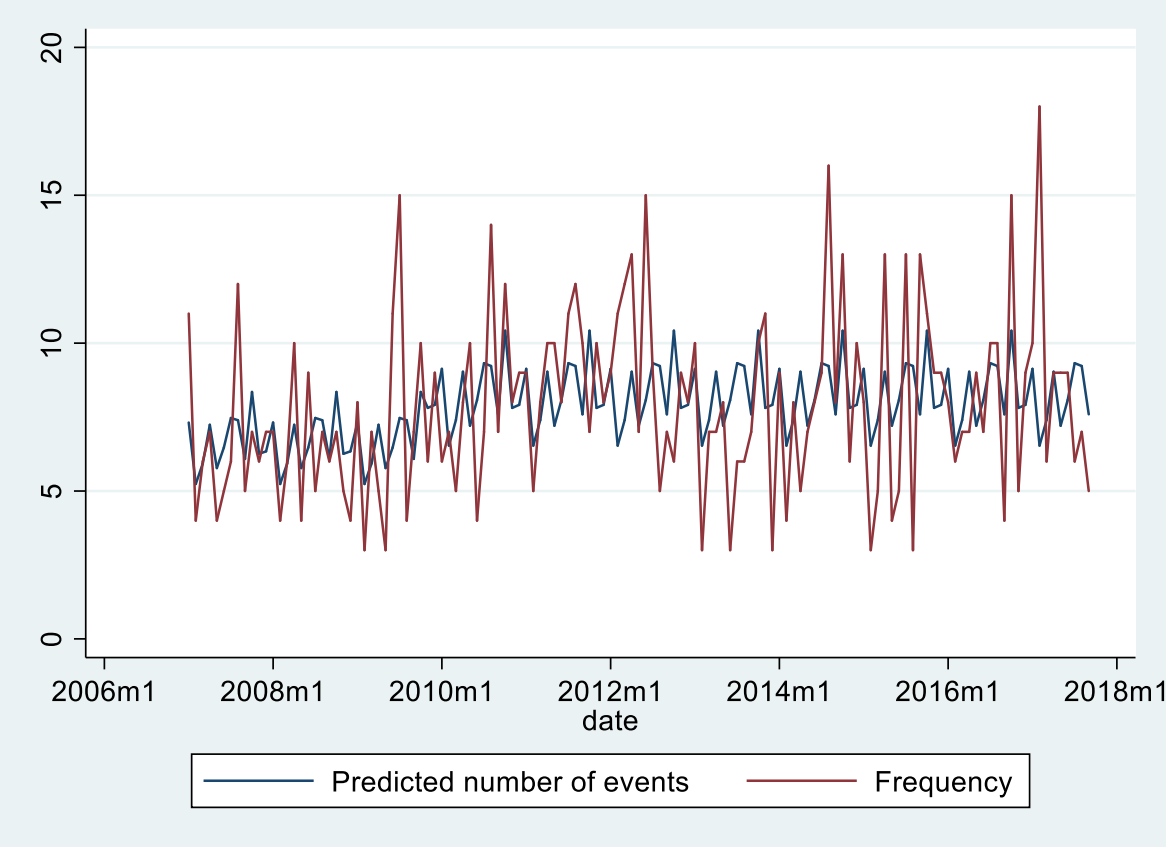


Figure 50 Actual vs predicted Deaths Other Than Homicide, all three census areas

Crimes Against Property

Between January 2007 and September 2017, there were 4372 Trooper incidents for crimes against property in the three census areas – 1827 in the Bethel census area, 1043 in the Kusilvak census area, and 1502 in the Yukon-Koyukuk census area. Figure 51 shows the distribution of incidents for crimes against property over time for the Bethel census area and Figure 52 shows the same information for the three census areas combined.

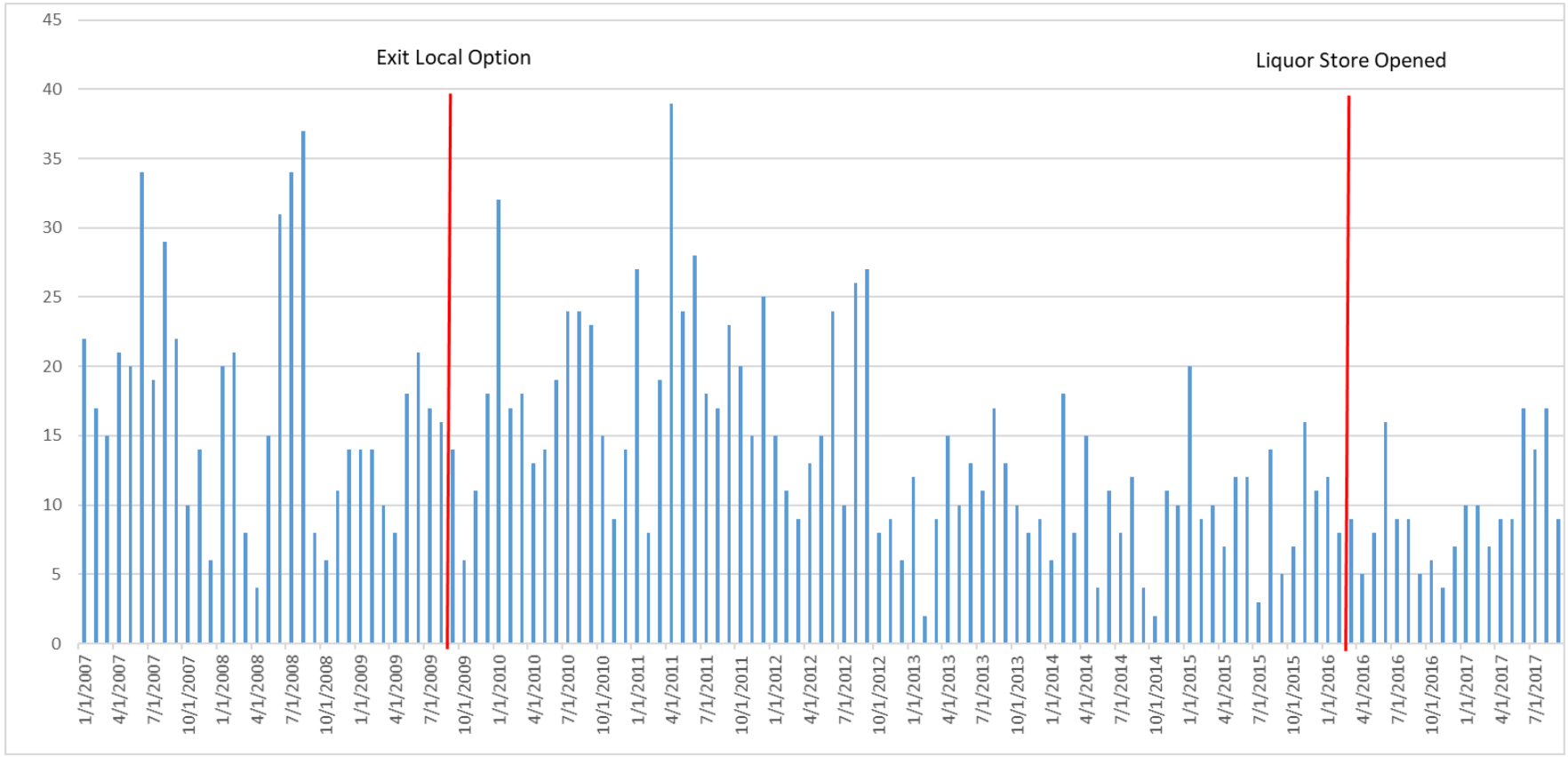


Figure 51 Crimes against property, monthly counts Bethel census area only

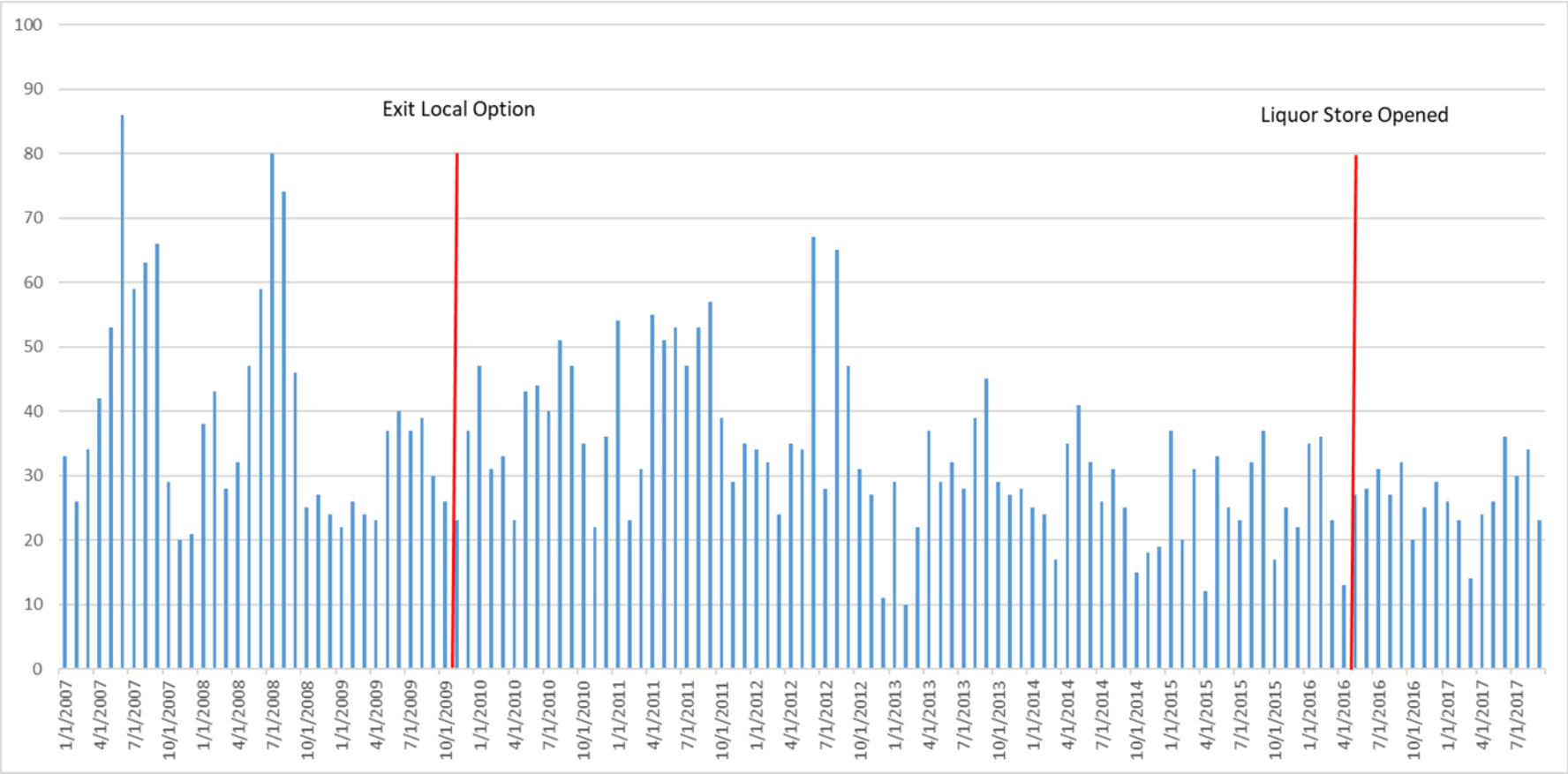


Figure 52 Crimes against property, monthly counts all three census areas

In the Bethel census area, after adjusting for seasonality and a small constant decrease over time, frequency of Trooper incidents for property crimes was approximately 57% higher after Bethel left local option (beta coefficient = 0.450, p < 0.001), although most of this increase appears to have occurred in the earlier years (2010 – 2012). Figure 53 shows the actual vs predicted monthly counts for property crime incidents in the Bethel census area. There was no association between property crime and the liquor store being open. Similarly, when the analysis included data from all three census areas, Trooper incidents for property crimes were approximately 27% higher than expected after Bethel left local option, even after adjusting for seasonality and a downward trend over time (beta coefficient = 0.239, p = 0.001). There was still no association between property crime and the liquor store being open. Figure 54 shows the actual vs predicted monthly counts for property crimes incidents in the three census areas combined.

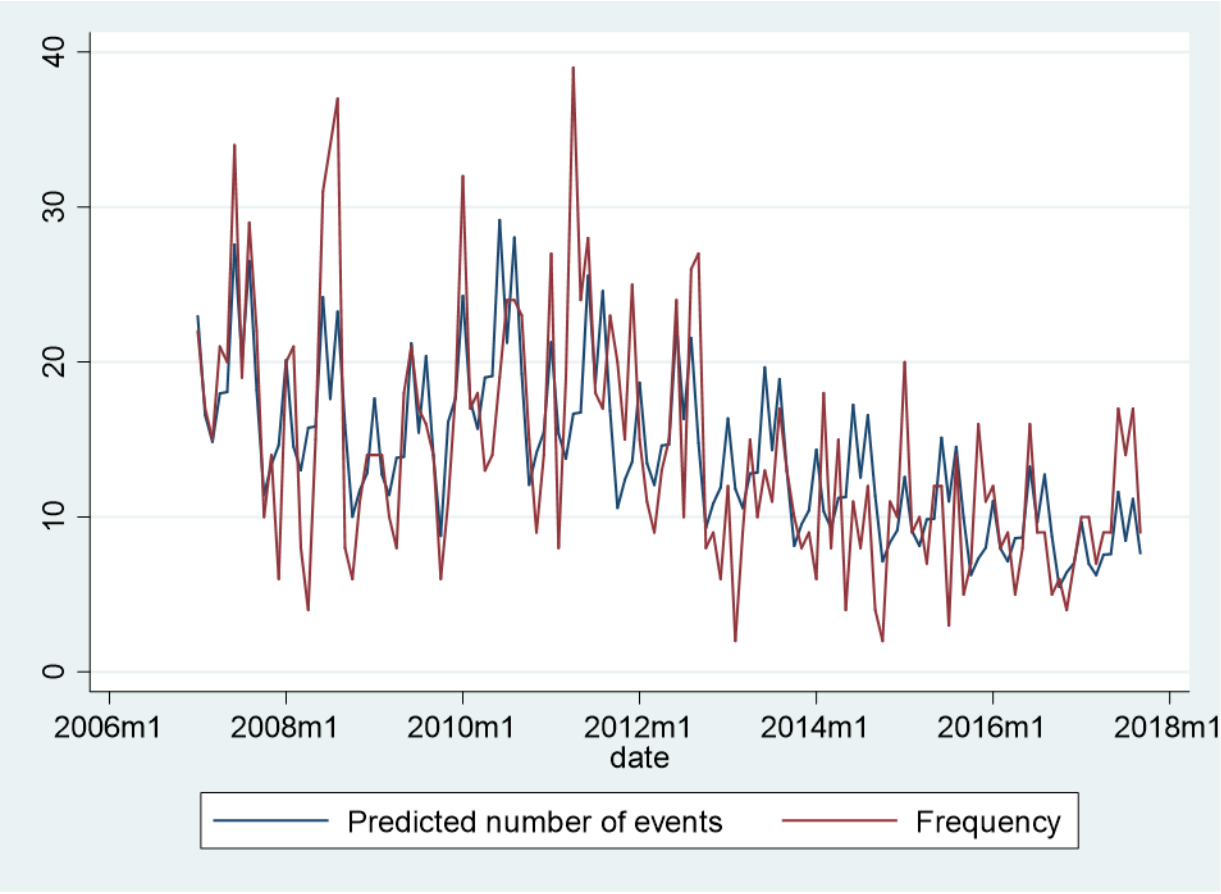


Figure 53 Actual vs predicted crimes against property monthly counts, Bethel census area

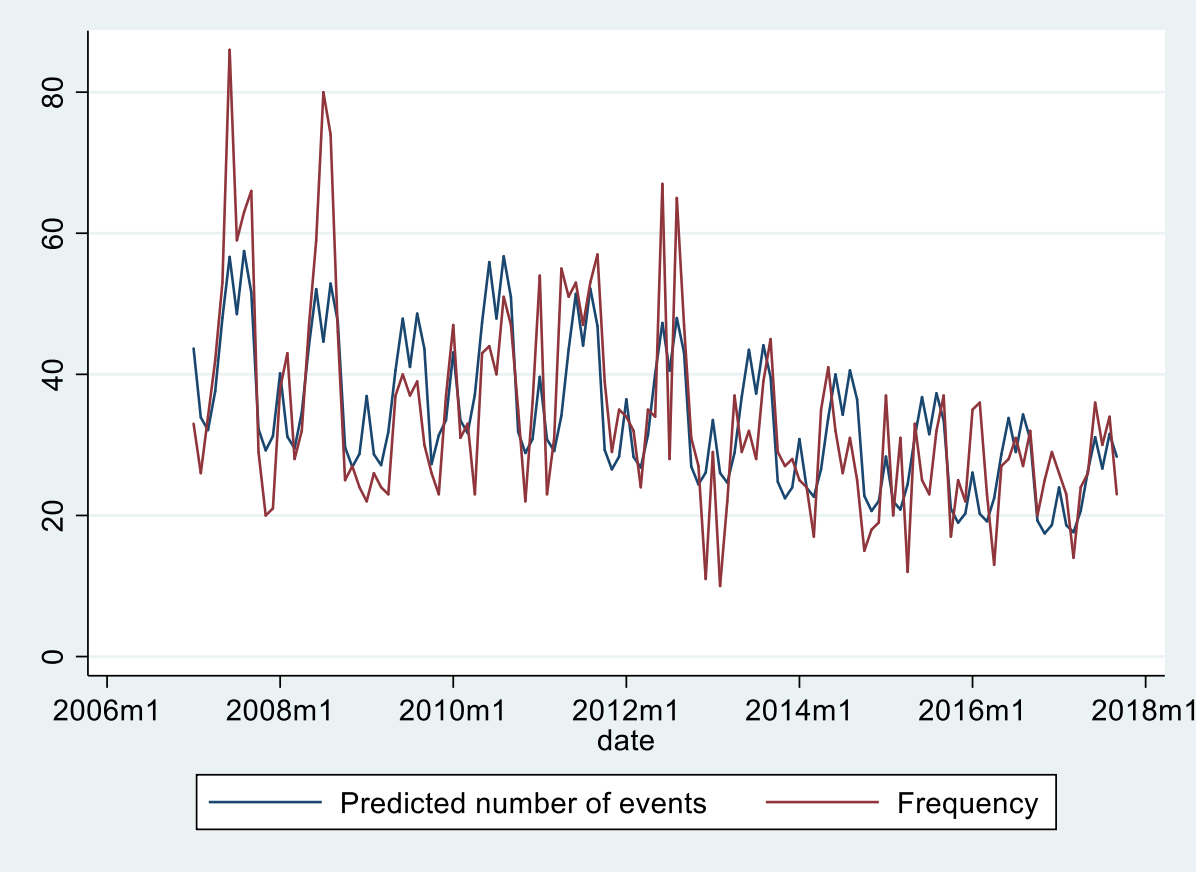


Figure 54 Actual vs predicted crimes against property monthly counts, all three census areas combined

Non-Criminal Activity

Between January 2007 and September 2017, there were 1416 Trooper incidents for non-criminal activity in the three census areas – 671 in the Bethel census area, 552 in the Kusilvak census area, and 193 in the Yukon-Kuyokuk census area. The majority, 88%, of these incidents were related to domestic violence and the remainder were related to stalking. Figure 55 shows the distribution of deaths other than homicides over time for the Bethel census area and Figure 56 shows the same information for the three census areas combined. Visually non-criminal activity appears consistently lower from mid-2013 through mid-2015, for both the Bethel census area and the three census areas combined.

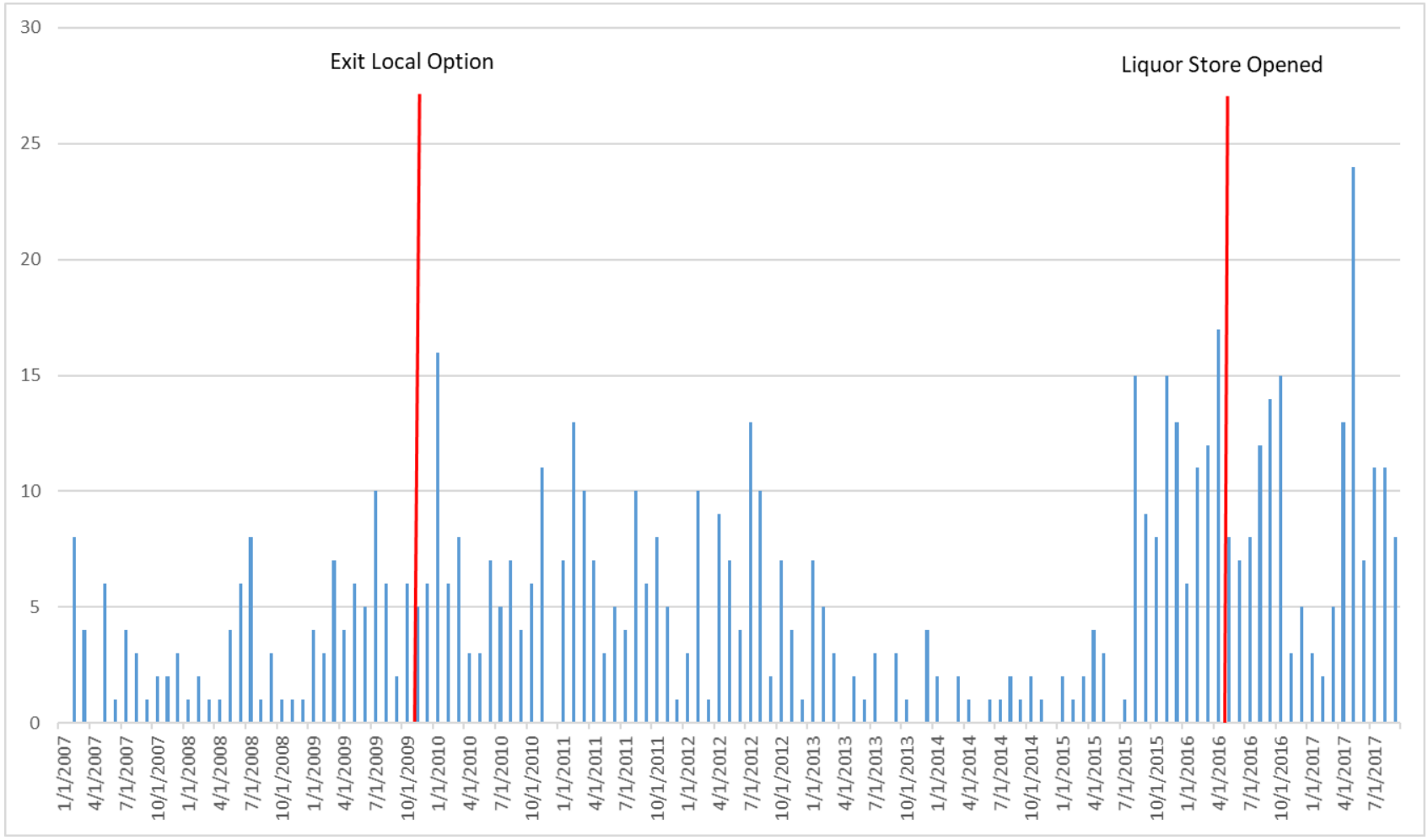


Figure 55 Non-Criminal Activity, monthly counts Bethel census area only

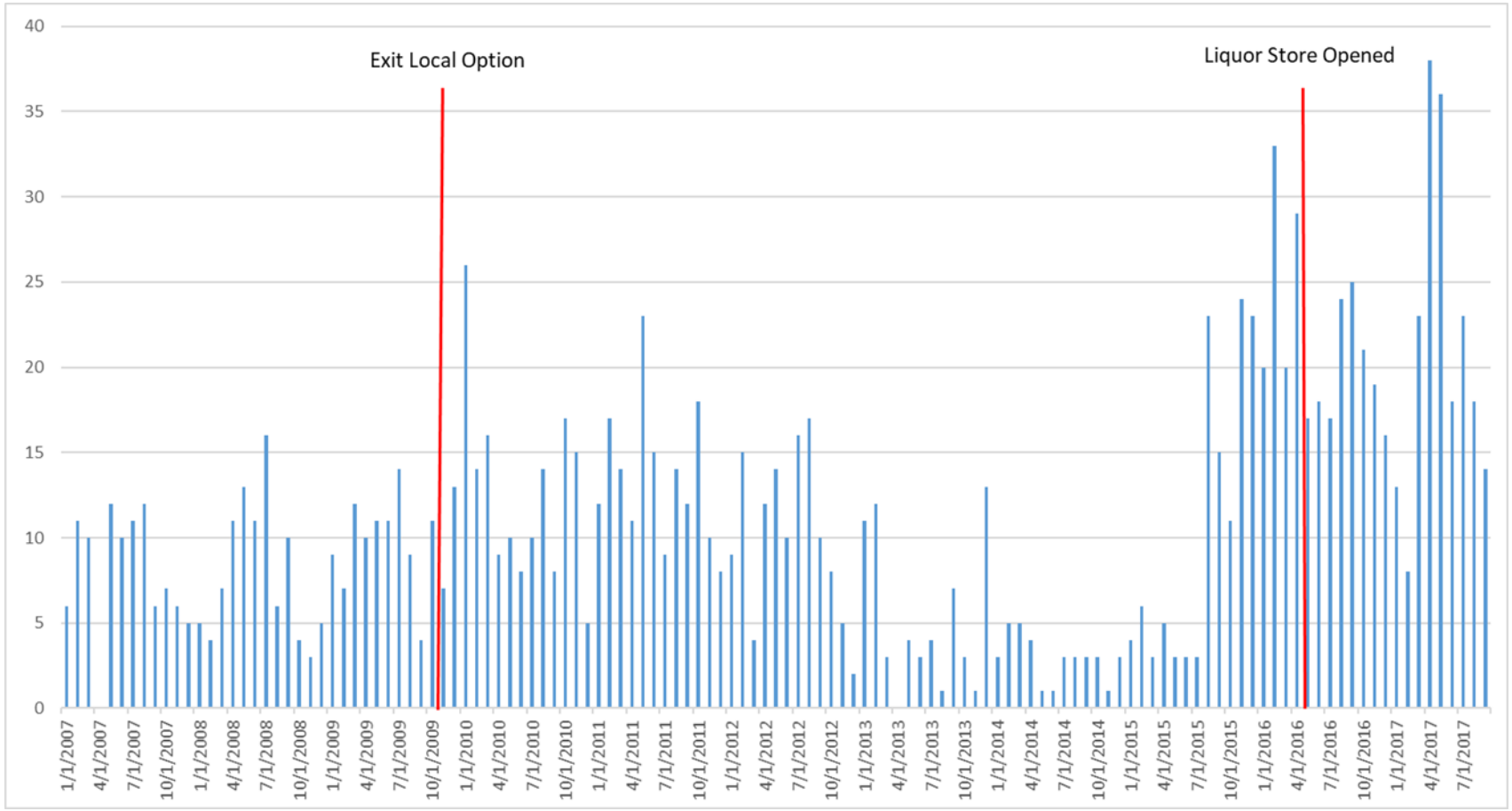


Figure 56 Non-Criminal Activity, monthly counts all three census areas combined

In the Bethel census area, Trooper non-criminal incidents were approximately 50% higher after Bethel left local option (beta coefficient = 0.394, p = 0.014) and another 80% higher when the liquor store was open. However, this model does not capture the lower volume from mid-2013 through mid-2015 and the increase in volume in 2015, before the liquor store opened. Figure 57 shows the actual vs predicted non-criminal activity for the Bethel census area.

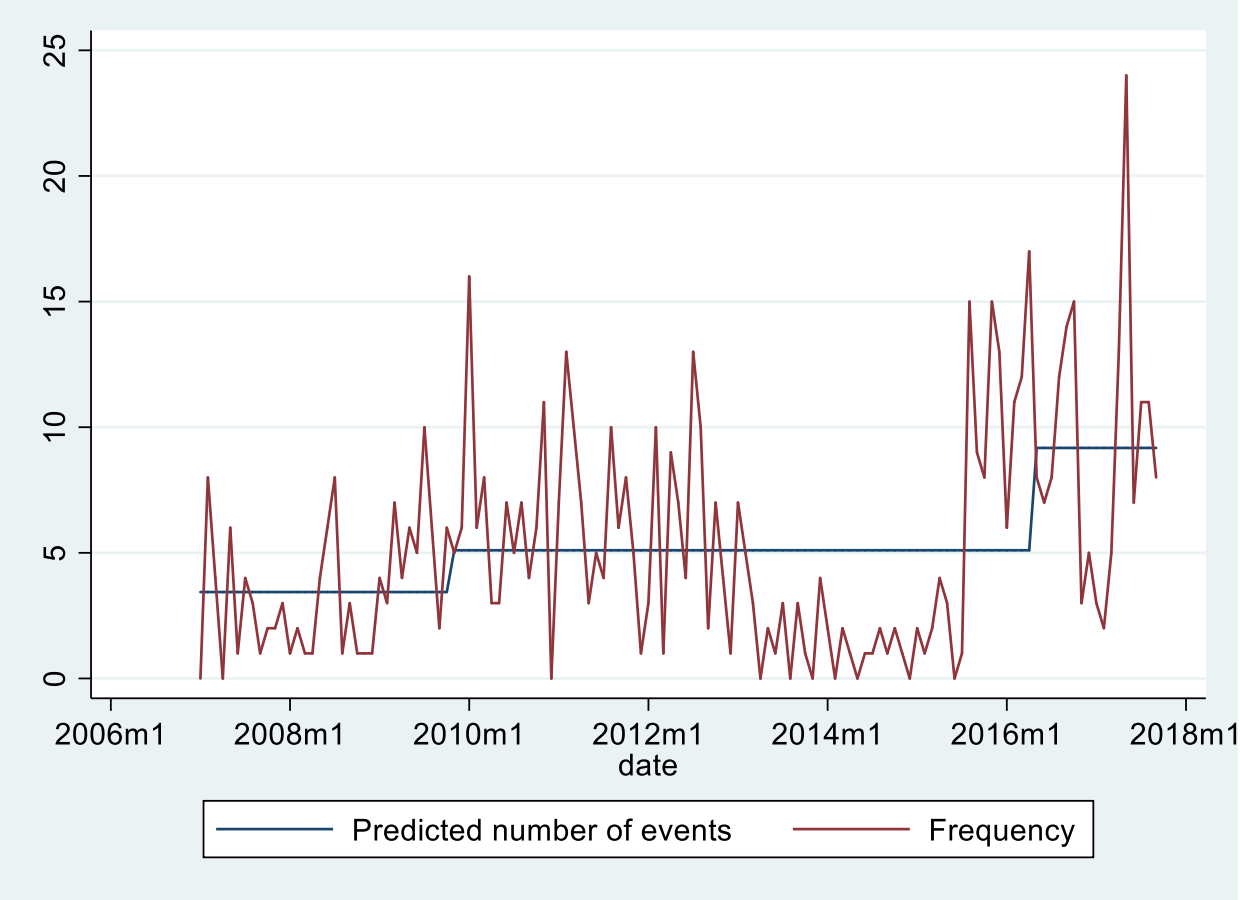


Figure 57 Actual vs predicted non-criminal activity monthly counts, Bethel census area

Based on regression analysis of data from all three census areas, monthly counts for non-criminal activity was more than twice as high while the liquor store was open (beta coefficient = 0.764, p < 0.001). However, as with the Bethel model, this model does not do a good job of capturing either the lower volume of non-criminal activity from mid-2013 through mid-2015 or the increase in activity starting in August 2015, nine months before the liquor store opened. Figure 58 shows the actual vs predicted non-criminal activity for all three census areas combined.

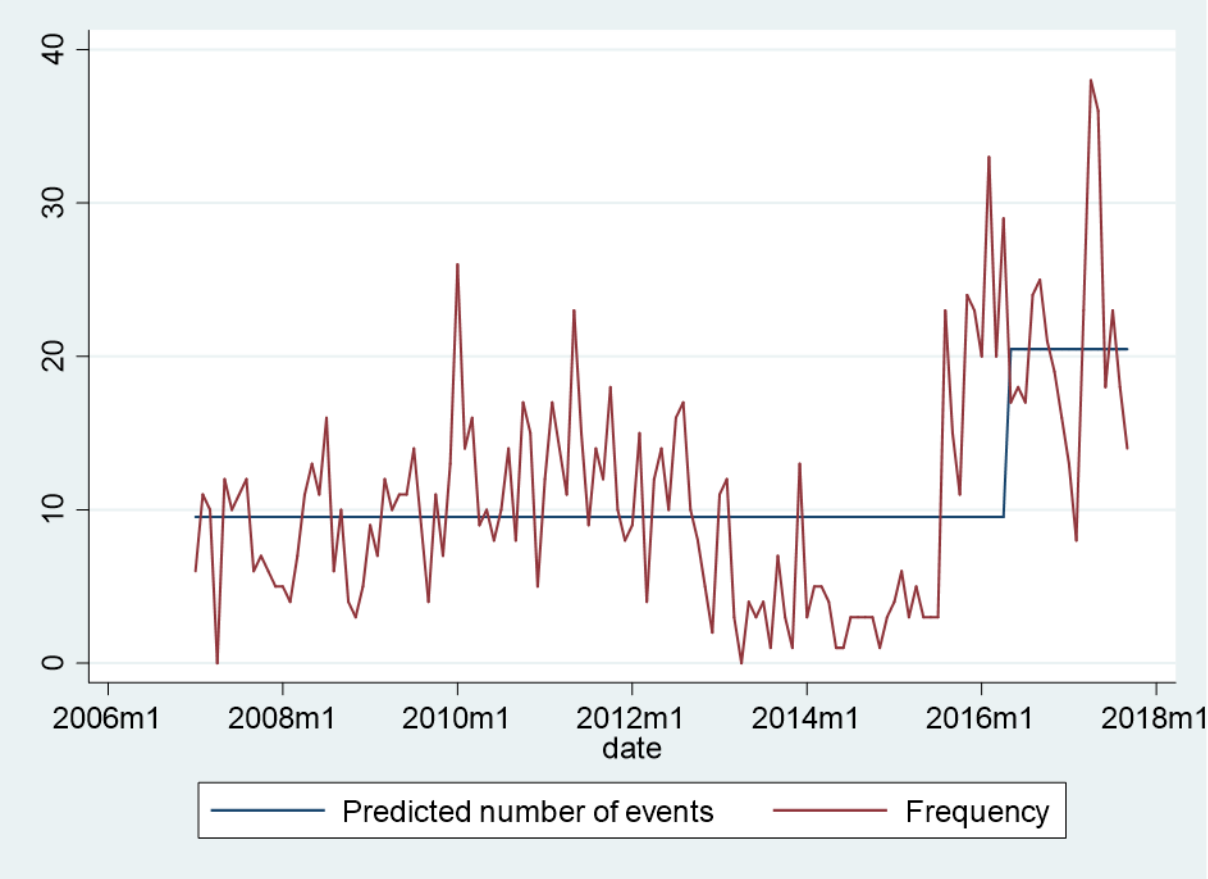


Figure 58 Actual vs predicted non-criminal activity monthly counts, all three census areas

Villages Near Bethel

There is concern that the villages with the easiest access to Bethel may be affected by Bethel's vote to leave local option and the opening of the liquor store even though they did not have any input into Bethel's local option decision. Therefore, we restricted the data to the following eight villages within 30 miles of Bethel and looked at associations between all AK State Trooper Incidents and Bethel's decision to leave local option and the opening of the liquor store:

- Akiachak
- Akiak
- Atmautluak
- Kasigluk
- Kwethluk
- Napakiak
- Napaskiak
- Oscarville

Similar to the previous analyses, we found seasonal effects in the data and a small but steady decrease over time. After adjusting for seasonality and the decreasing trend over time, we

found that monthly counts for all incidents in these seven villages were almost 1.5 times higher than expected (beta coefficient = 0.898, p < 0.001) after Bethel voted to leave local option and another 55% higher while the liquor store was open (beta coefficient = 0.449, p < 0.001). Figure 59 shows the actual vs predicted for total monthly incident counts for January 2007 through September 2017 for the eight villages listed above. The regression model fits the data reasonably well, but fails to capture some of the more extreme peaks and valleys in the monthly incident counts.

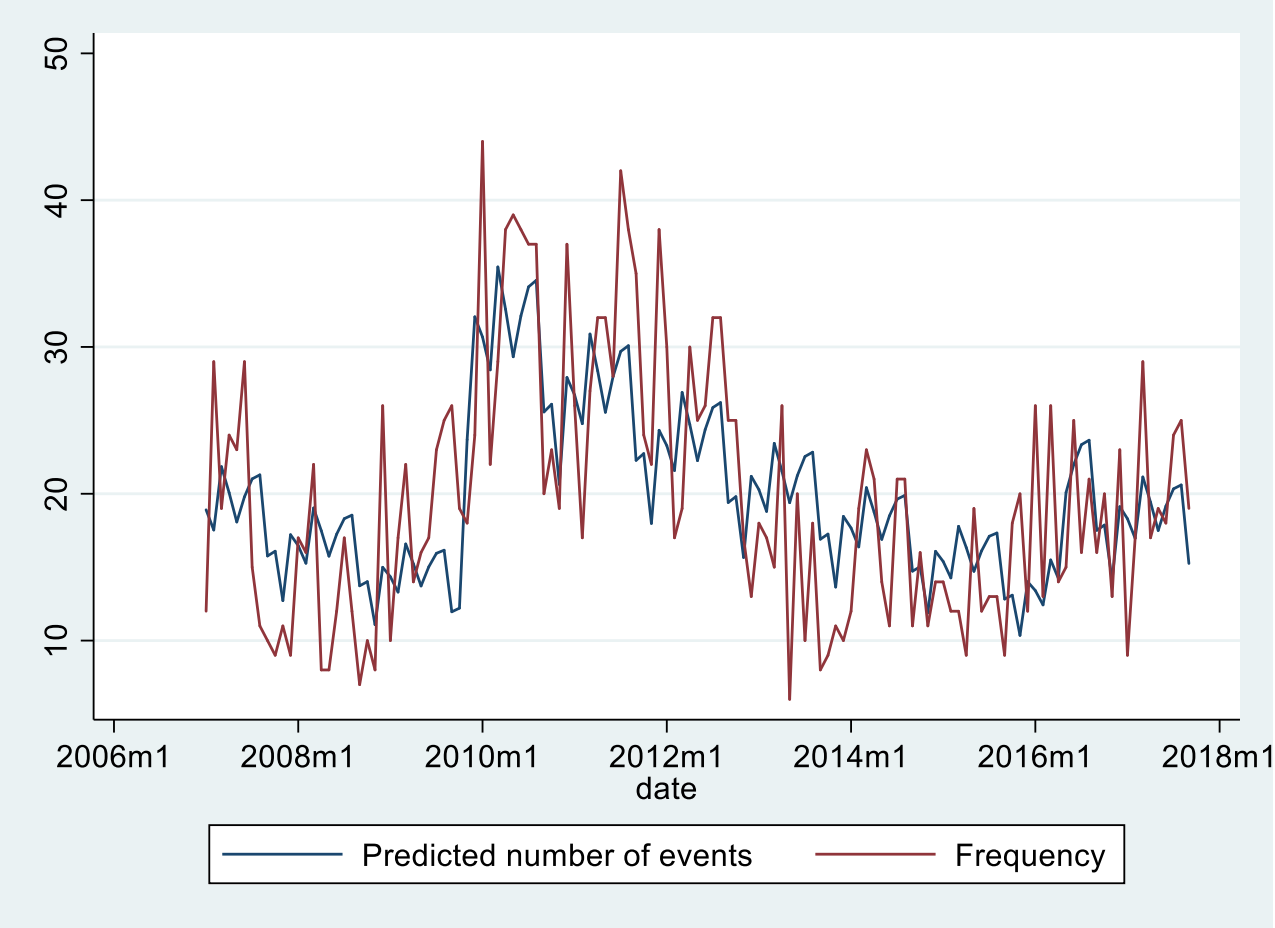


Figure 59 Actual vs predicted total monthly incident count, eight villages within 30 miles of Bethel

A similar analysis restricting data to the villages outside of Bethel in the Bethel census area found that the monthly counts for all incidents were 78% higher (beta coefficient = 0.575, p < 0.001) after Bethel voted to leave local option and an additional 23% higher (beta coefficient = 0.207, p = 0.001) when the liquor store was open. Figure 60 shows the actual vs predicted for total monthly incident counts for January 2007 through September 2017 for the Bethel census area excluding incidents in Bethel itself. The regression model fits the data reasonably well but underestimates a number of extreme peaks in the data.

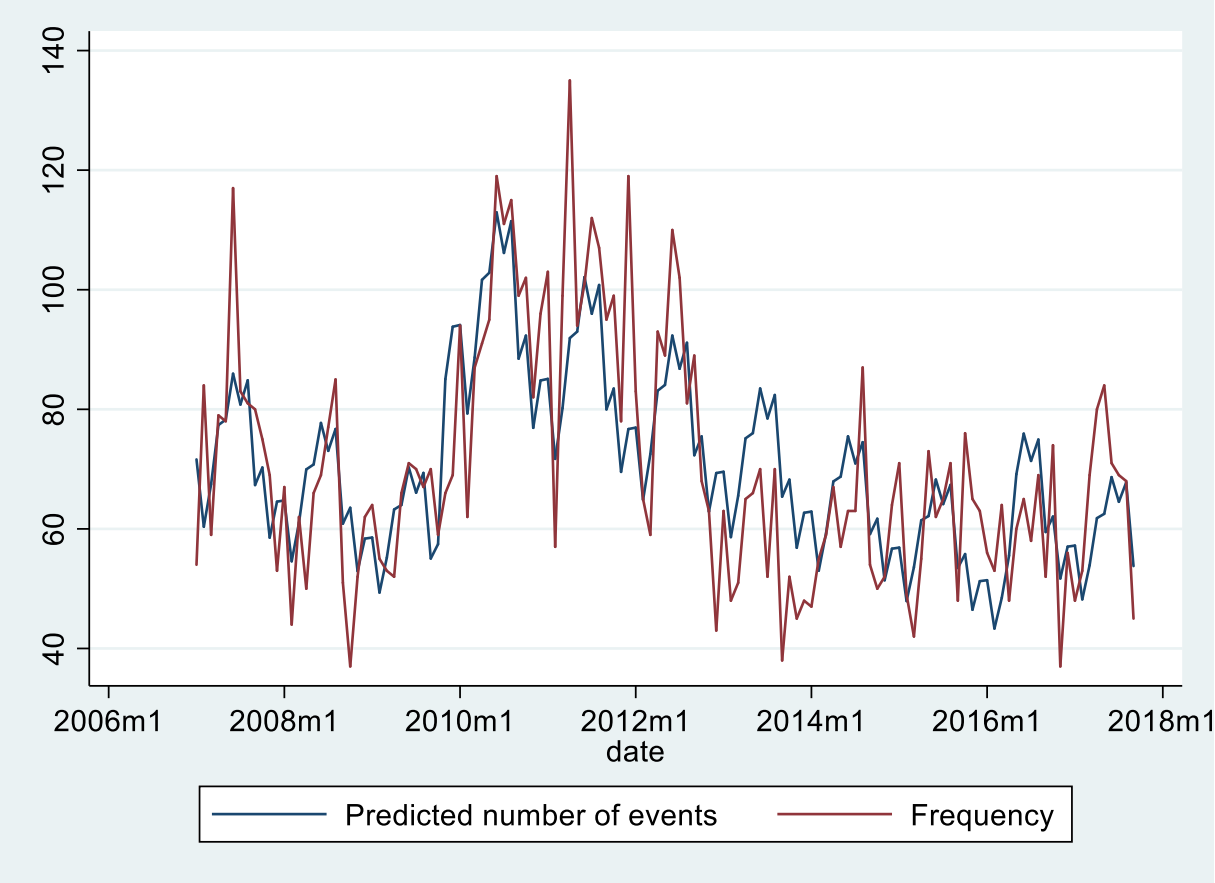


Figure 60 Actual vs predicted total monthly incident counts, Bethel census area excluding Bethel

Trooper Summary

After taking into consideration seasonality and an underlying downward trend in AK State Trooper incidents from 2007 through 2017, the total monthly count of Trooper incidents were approximately 50% higher than would have been expected otherwise in the Bethel, Kusilvak, and Yukon-Koyukuk census areas combined after Bethel exited local option. When the AC Quickstop liquor store was open in Bethel, these monthly counts were an additional 23% higher than would have been expected otherwise. The association was even more pronounced when the data were restricted to the Bethel census area, even when Bethel itself was excluded from the analysis.

Similarly, monthly counts for alcohol crimes such as possession or transport of alcohol were more than twice what otherwise would have been expected after Bethel exited local option, and twice as high again when the liquor store opened. DUI incidents were approximately 90% higher after Bethel left local option, although this increase attenuated when the liquor store opened with levels only 33% higher than expected.

Monthly counts for assault incidents were 50% higher than expected after Bethel left local option – both across the three census areas combined and in the Bethel census area alone. Monthly counts for assault increased another 10% across the three census areas combined while the

liquor store was open. In Bethel that increase was 20% when the liquor store was open. There was no association between monthly counts for sexual assaults and leaving local option in the Bethel census area or in the three census areas combined. However, in the Bethel census area monthly counts for sexual assaults were 44% higher than otherwise expected when the liquor store was open. This association did not hold when looking at data from the three census areas combined. Conversely, monthly counts for deaths other than homicide were approximately 25% higher than expected after Bethel left local option, but there was no association between deaths other than homicide and the liquor store being open. Crimes against property were also higher than expected after Bethel left local option, approximately 50% higher in the Bethel census area and 25% higher in the three census areas combined. However, there was no association with the liquor store being open.

Yukon-Kuskokwim Health Corporation, 2013 - 2018

Data

Data were provided for the Sobering Center, the Ayagnirvik Healing Center (residential treatment for substance use disorder), inpatient visits (admit and discharge date and time) and emergency room (ER) visits with an alcohol-related visit diagnosis. Data were available for 2013 through 2018.

The Sobering Center opened as a unit separate from the ER on January 28, 2013. The goal of the Sobering Center is to divert intoxicated individuals from the ER and jail to a more appropriate and safe place to become sober. Before the Sobering Center opened, approximately 20% of ER visits were alcohol-related. The Sobering Center's goal was to reduce ER utilization for alcohol-related visits to no more than 4%. They met that goal in mid-2015.

Taking into consideration the seasonality of Sobering Center Use, with peaks in April and October, a steady increase in visits was observed from 2013 through May 2018. As expected with an increasing number of intoxicated individuals being diverted from the ER to the Sobering Center, Alcohol-related ER visits decreased over time. Visually, the monthly counts for ER visits during the 2016 – 2018 time period were noticeably lower than during the 2013 – 2015 time period. Because of this interplay between the Sobering Center and alcohol-related ER visits, we analyzed the ER and Sobering Center data together.

Inpatient and ER data were limited to visits with a visit diagnosis that fell into one of the following categories: Alcohol Abuse, Alcohol Intoxication, Alcohol Withdrawal, Alcohol-related mood/mental disorder, or Other alcohol-related problem. Approximately 85% of the inpatient visits had a diagnosis of Alcohol Abuse with approximately 5% each falling into Alcohol Intoxication, Alcohol Withdrawal, and Other alcohol-related problems. Similarly, approximately 85% of the ER visits had a diagnosis of Alcohol Abuse, with approximately 7% having a diagnosis of Alcohol Intoxication, 4% Alcohol Withdrawal, 4% Other Alcohol-related problems.

The Ayagnirvik Healing Center PAHC provides a continuum of care for individuals experiencing substance use disorder. The Healing Center operates an ASAM Level III.5 16 bed treatment center with an average six week length of stay for participants who successfully complete the program. The Healing Center also offers Outpatient and Recurring care. Because of potential overlap between inpatient and residential care, we examined inpatient and residential data separately and combined.

Results

Figure 61 depicts the monthly counts for Sobering Center and alcohol-related ER visits combined form 2013 through 2018.

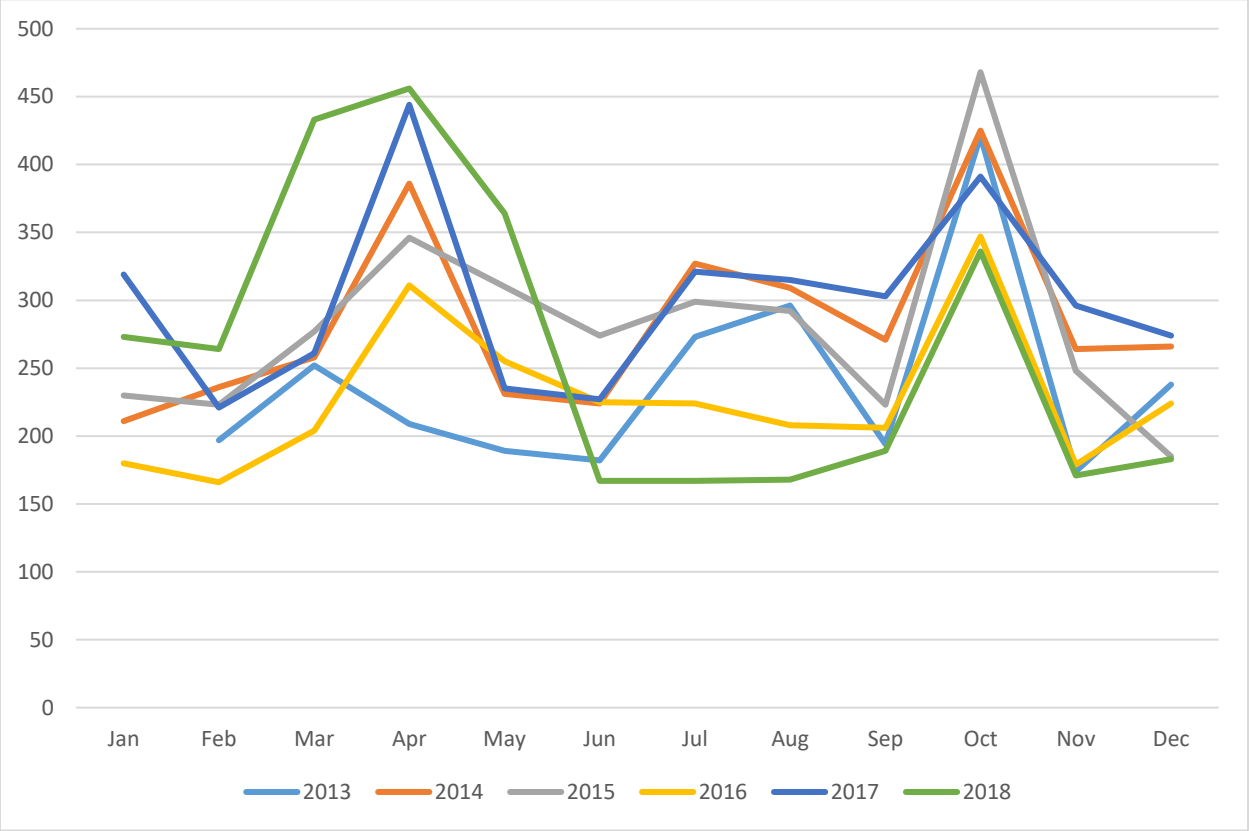
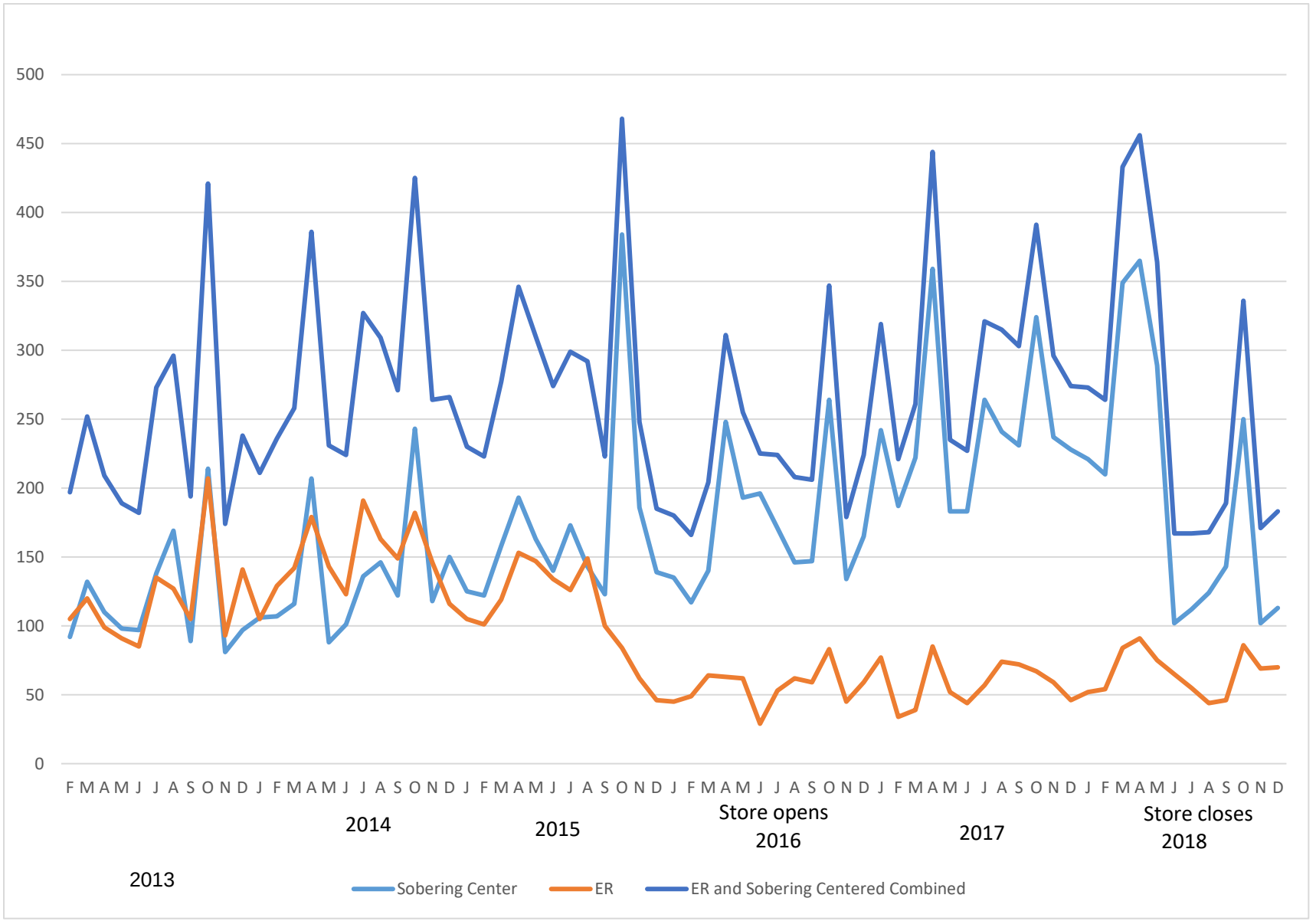


Figure 61 ER and Sobering Center Combined by year

In general the monthly counts show a similar pattern over the twelve months of each year with peaks in October, and also most years in April. The highest monthly counts for February through May were recorded in 2018 and the lowest monthly counts for June through December were also recorded in 2018. Excluding 2018, the lowest monthly counts occurred in 2013 and 2016. Monthly counts for 2014, 2015, and 2017 tended to group together above the 2013/2016 numbers, lower than the 2018 numbers for the first five months of the year but higher than 2018 for the last 7 months of the year. The AC Liquor Store opened in May 2016 and closed in May 2018.

Figure 62 depicts the monthly counts for ER and Sobering Center visits separately and combined from 2013 through 2018. This figure shows the drop in ER visits in 2016 and the upward trend in Sobering Center visits from 2013 through mid-2018. The figure also suggests that the combined ER and Sobering Center visits have held relatively steady over time, with possible drop in the second half of 2018.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2013
2014
2015
Store opens
2016
2017
Store closes
2018
Sobering Center
ER
ER and Sobering Centered Combined

In order to assess the effect of the opening and closing of the liquor store on the combined Sobering Center and alcohol-related ER visits, we used negative binomial time series analysis with robust standard errors. Because of the seasonality evident in the data, we modelled the combined ER/Sobering Center counts as a function of month of year and whether or not the liquor store was open. Figure 63 shows the predicted vs actual values for the time period from February 2013 through December 2018. According to this model, the combined ER/Sobering Center counts were approximately 15% higher when the liquor store was open, even after adjusting for month of year (Store beta coefficient = 0.145, p = 002). Regression modeling does not indicate a significant change over time on top of the changes related to month of year and the liquor store.

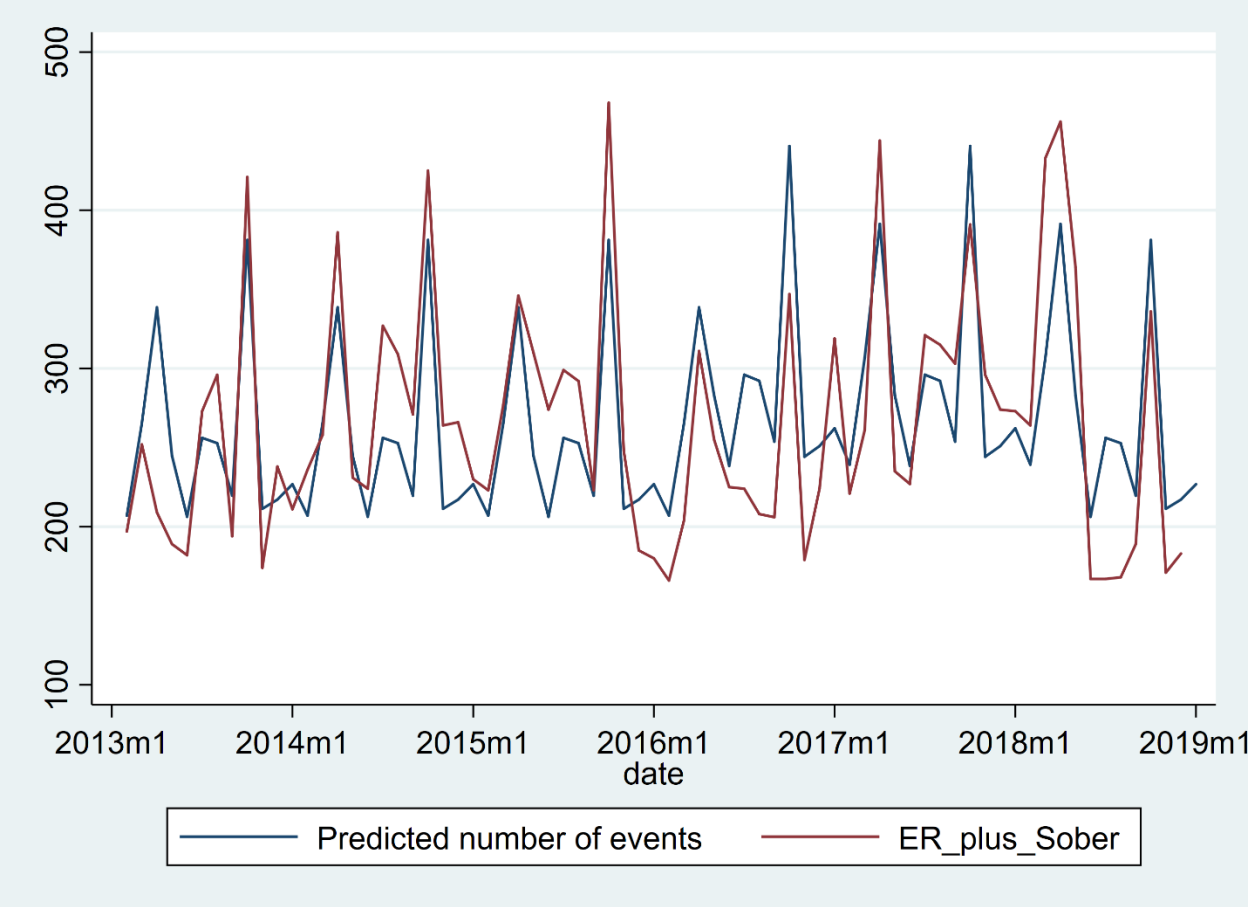

Figure 63 ER and Sobering Center, predicted vs. actual

Alcohol-related inpatient admissions by year are shown in Figure 64.

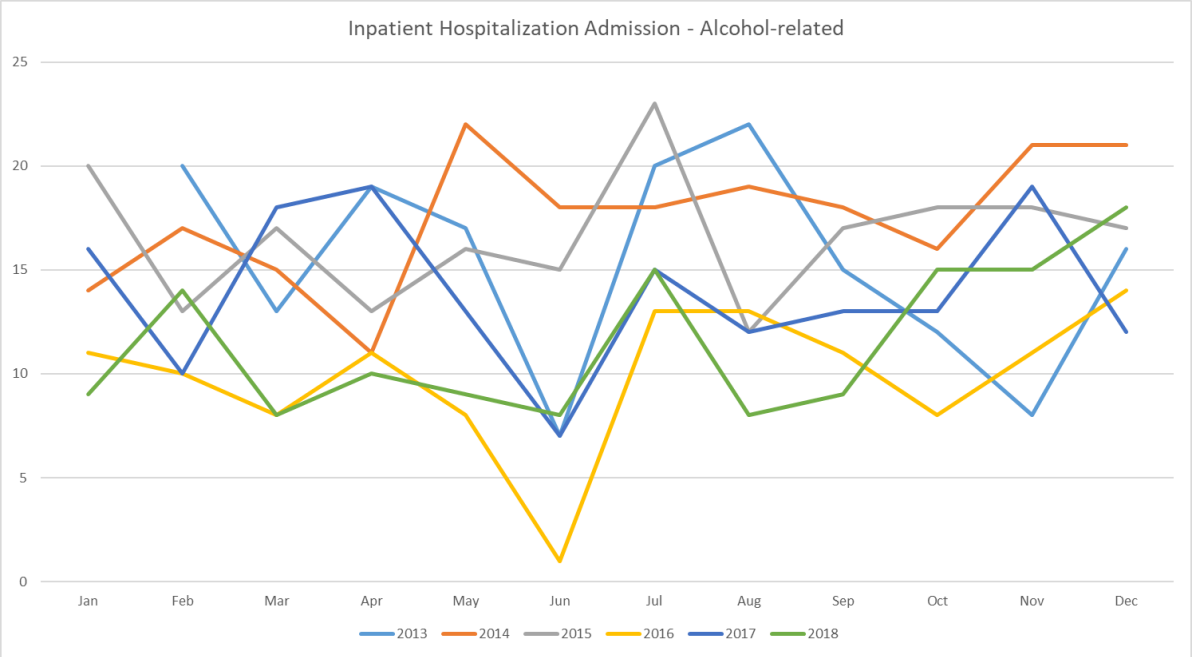

Figure 64 Monthly Alcohol-related Inpatient Hospital Admissions by year

This data does not show the same consistent peaks in October, and to a lesser extent April, that are seen for many other variables. The year with the lowest counts for inpatient admissions is 2016, followed in many months by 2018. The year with the highest counts varies by month. Given the potential overlap between alcohol-related inpatient admissions and residential treatment, we chose to examine these two categories both separately and together visually before running regression models. Figure 65 depicts the residential treatment admission by year, excluding opioid treatment. The highest monthly residential treatment admissions were primarily in 2017 with some noticeable peaks in 2016 and 2018.

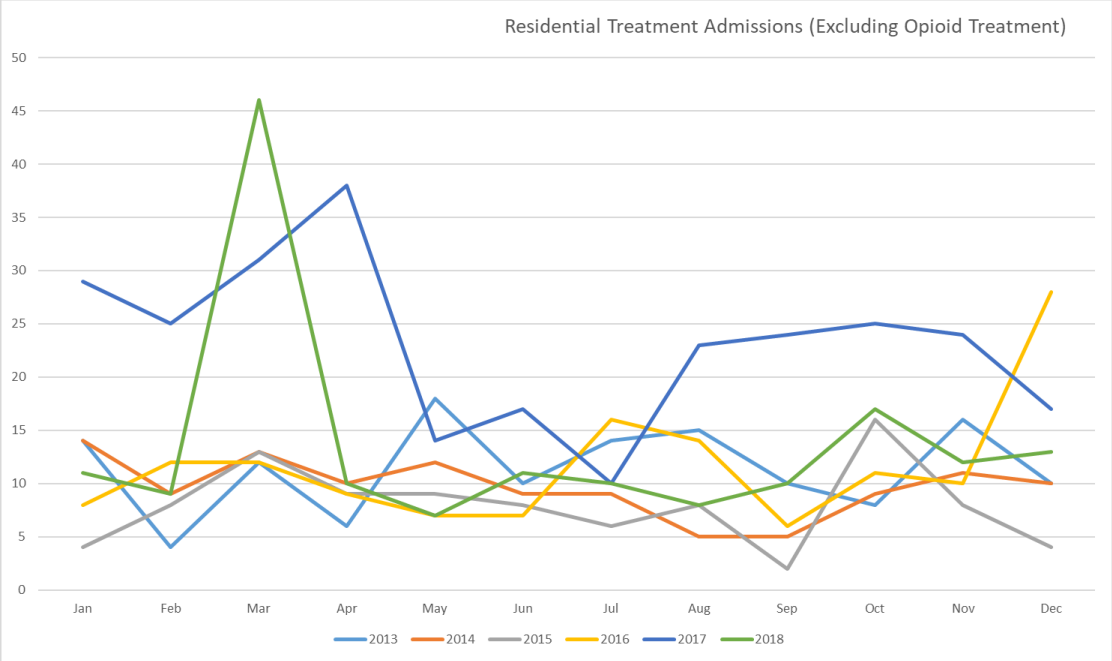

Figure 65 Residential Treatment Admissions, excluding opioid treatment, by year

Figure 66 depicts the inpatient and residential treatment admissions (excluding opioid residential treatment) separately and combined from February 2013 through December 2018. Prior to the liquor store opening, both the alcohol-related inpatient admissions and the residential treatment, excluding opioid treatment, were relatively constant with the inpatient admissions consistently higher than the residential treatment. While the store was open, the residential treatment admissions were consistently higher than the inpatient admissions.

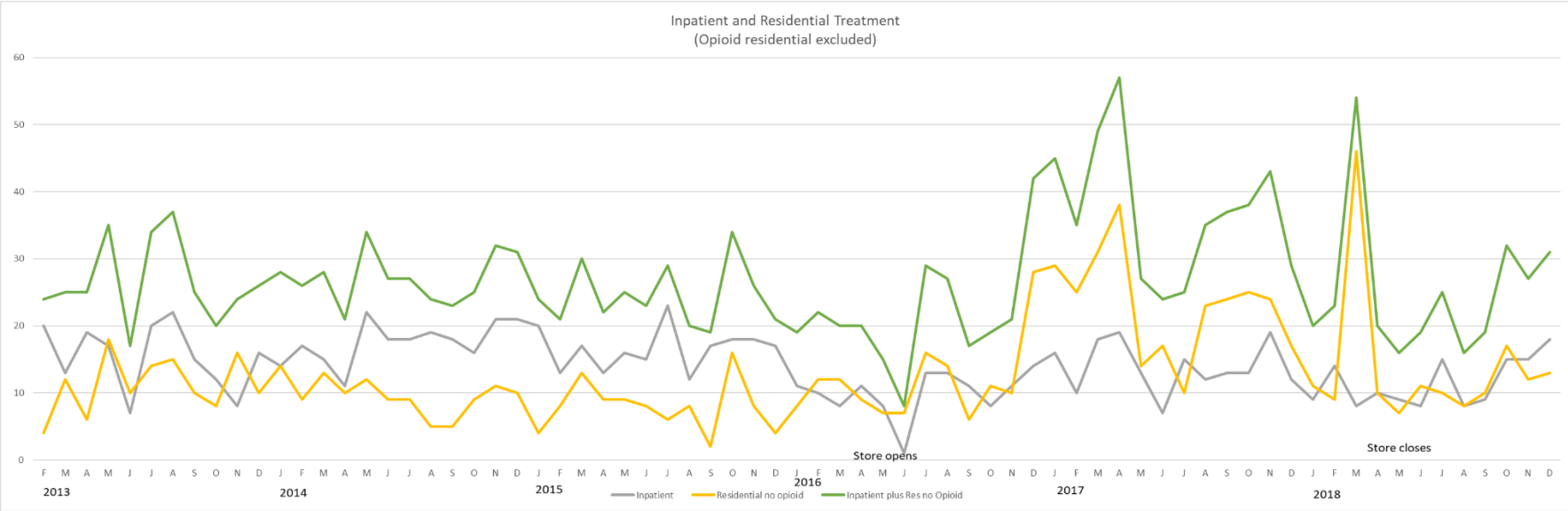

Figure 66 Inpatient and Residential Treatment, excluding residential opioid treatment, 2013 - 2018

Negative binomial time series analysis of the inpatient admissions counts found a small but statistically significant (p = 0.014) downward trend in alcohol-related inpatient hospital admissions over the course of the study (February 2013 through December 2018) with an additional decrease of approximately 14% while the liquor store was open (p = 0.06). Figure 67 shows the predicted vs. actual monthly inpatient admission counts.

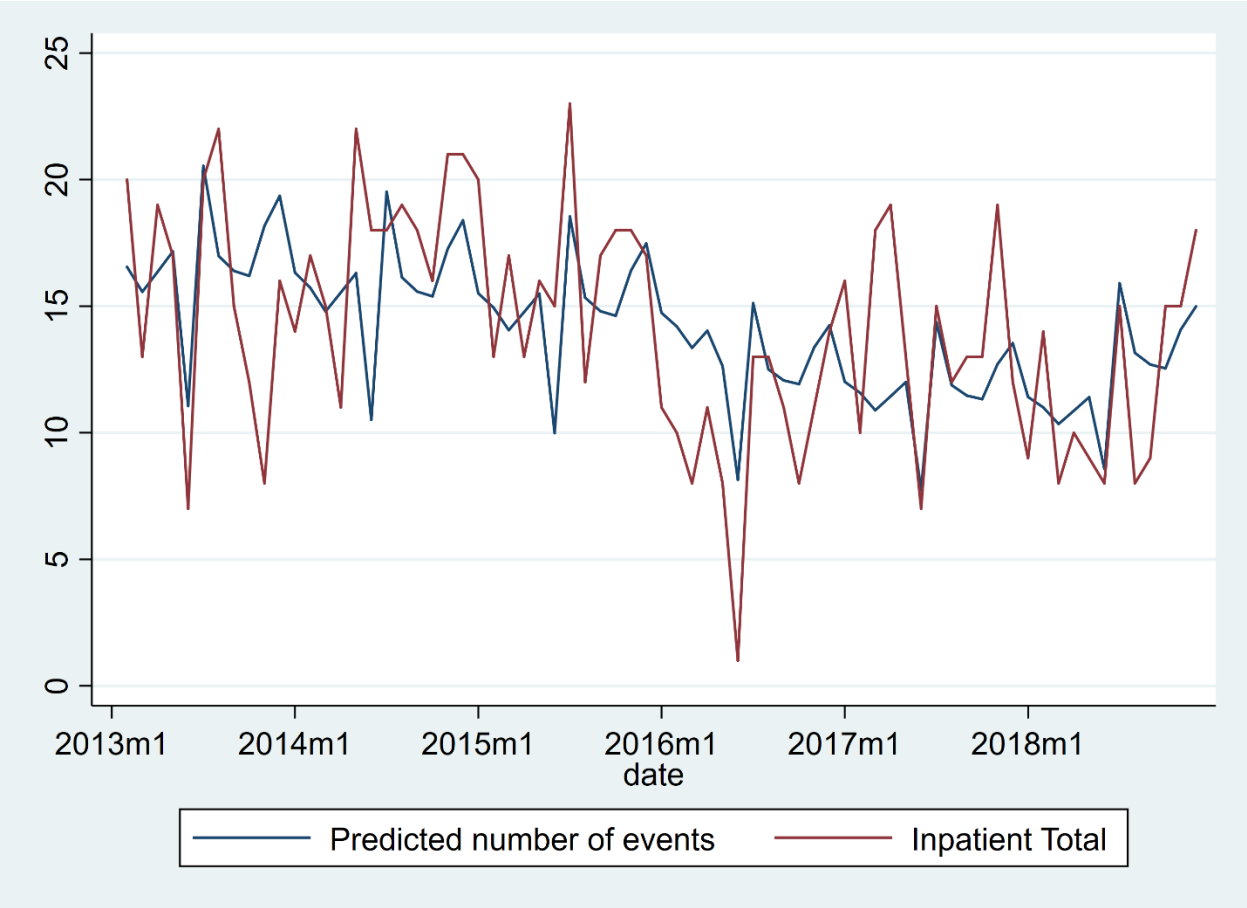

Figure 67 Inpatient alcohol-related admissions, predicted vs. actual

Similar analysis of residential treatment admissions found a 90% increase (p < 0 001) in monthly admissions while the store was open. Although there was suggestion of an increase in residential treatment admissions over time in some of the models considered, the model with the best fit did not include a time trend variable. Figure 68 shows the predicted vs. actual monthly residential admission counts, excluding opioid treatment.

Draft

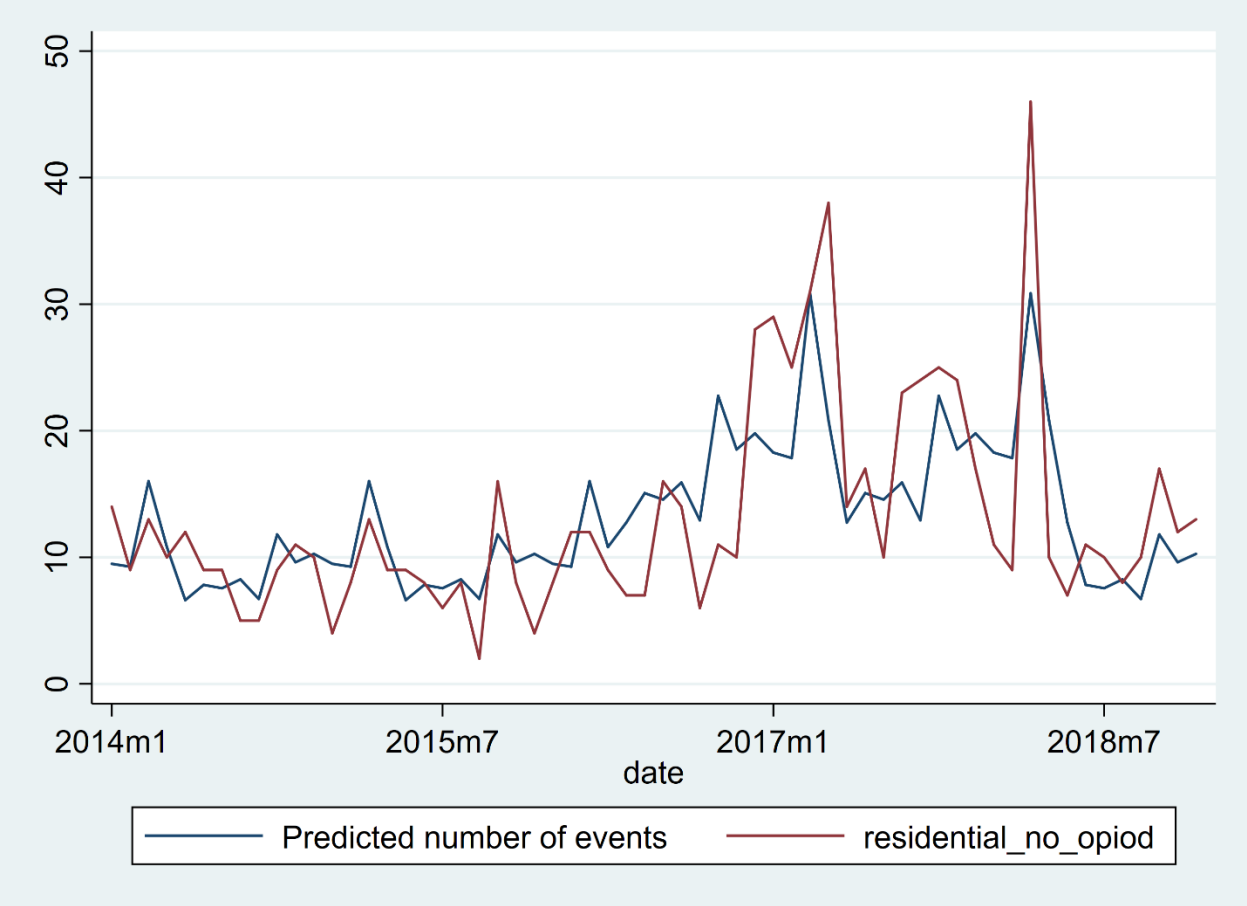

Figure 68 Residential treatment admissions, excluding opioid admissions, predicted vs. actual

We attempted to model the inpatient and residential treatment combined, however we were not able to develop a model that fit the data well and concluded that the separate models are more informative than a combined model.

YKHC Summary

The Emergency Room and Sobering Center data is best analyzed together, while the inpatient and residential treatment data is best analyzed separately. ER and Sobering Center use varies by month. However, over and above this monthly variation the combined ER and Sobering Center use increased approximately 15% while the liquor store was open.

Inpatient admissions increased at a small but steady rate from 2013 through 2018. However, admissions were approximately 14% lower than would otherwise have been expected when the liquor store was open.

Residential treatment admissions excluding opioid treatment were substantially elevated, approximately 90% increase, while the liquor store was open, although some of this increase might have been related to an increasing trend over time.

Alaska Office of Children's Services, Bethel Office, 2008 – 2018

Data

The Alaska Office of Children's Services (OCS) provided monthly counts for the Bethel region from January 2008 through December 2018 for the following measures:

- Protective Service Reports (PSRs) received
- PSRs screened in
- Substantiated Initial Assessments Complete
- Children removed from their home
- Children in out of home (OOH) placement at the end of the month

With data going back to 2008, we are able to evaluate associations between these OCS measures and local option status and liquor store status. For this evaluation we considered the following time periods:

- Local option in effect: January 2008 – October 2008
- No local option and no liquor store:
    - November 2008 – April 2016
    - June 2018 – December 2018
- Liquor store open: May 2016 – May 2018

Results

Figure 69 shows monthly counts for all five measures from January, 2008 through December, 2018.

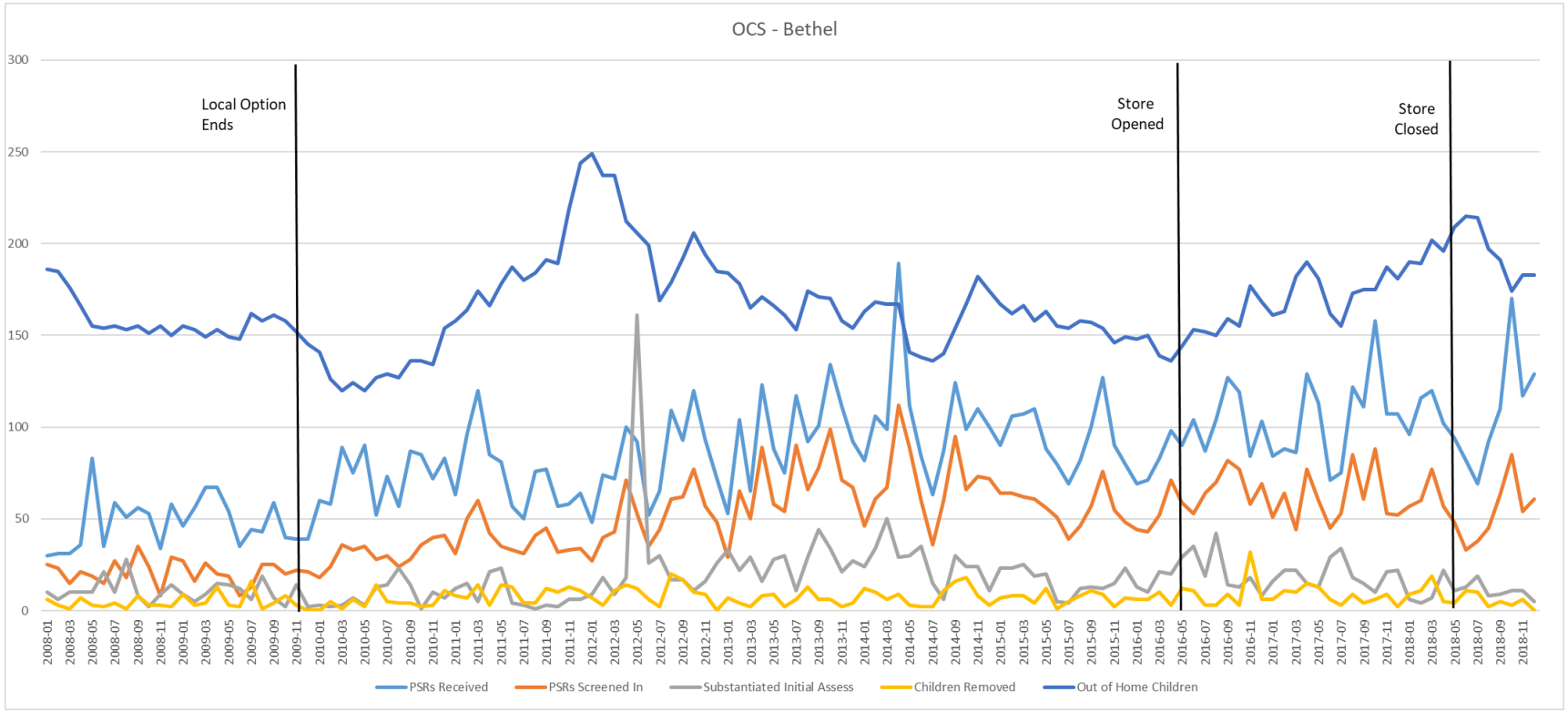

Figure 69 OCS measures, by month

Regression analysis found that even after adjusting for seasonality and a small but statistically significant monthly increase over the entire project period, the monthly count for PSRs received was approximately 34% higher once Bethel left local option (beta coefficient = 0.294, p<0.001). There was no evidence that the opening of the liquor store had an effect on the monthly counts of PSRs received. Figure 70 shows the Predicted vs Actual monthly counts for PSRs received during the study period.

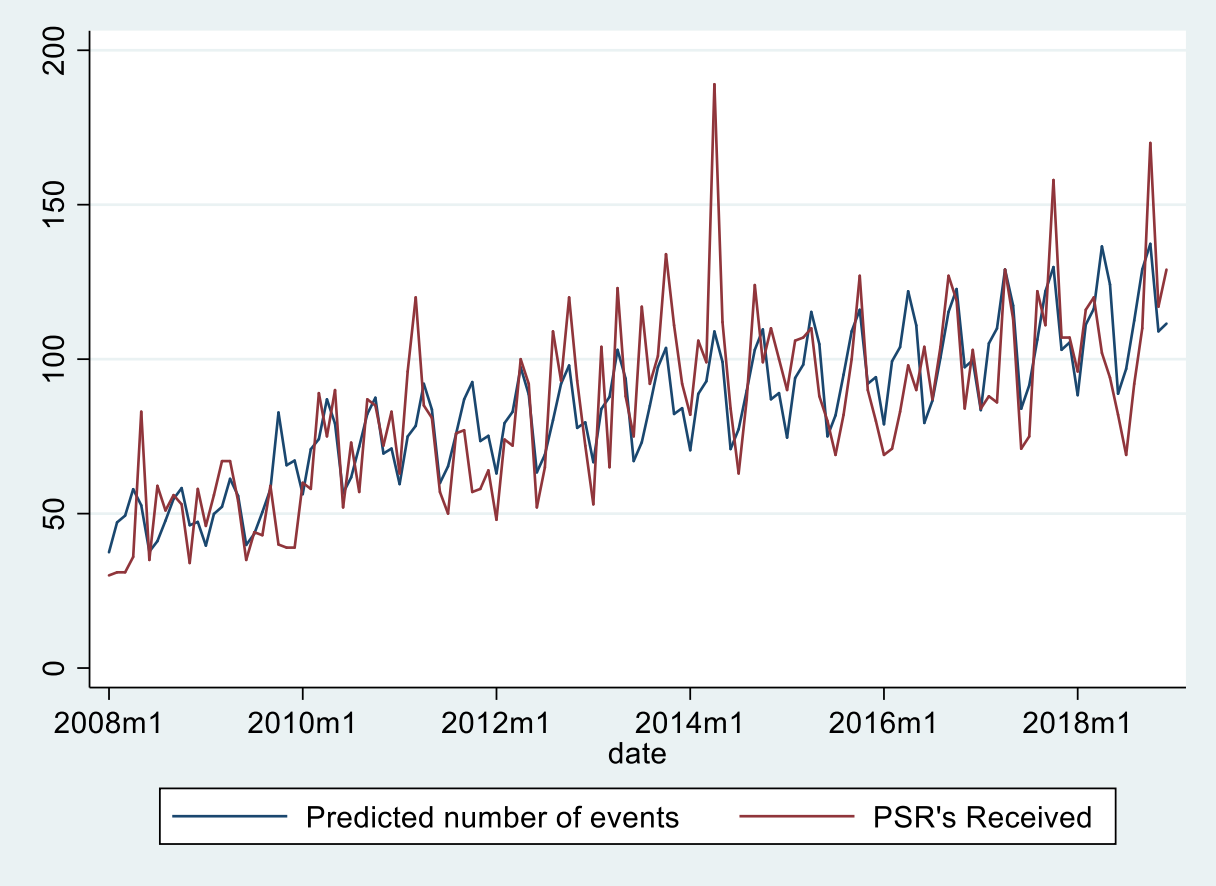

Figure 70 Predicted vs Actual, PSRs received

Similarly, regression analysis found that even after adjusting for seasonality and a small but statistically significant monthly increase over the entire project period, the monthly count for PSRs screened in was approximately 73% higher once Bethel left local option (beta coefficient = 0.549, $p<0.001$). While the model fits the data reasonably well, the model does not capture the visually noticeable increase in PSRs screened in from late 2013 through 2014, after Bethel left local option but before the liquor store opened. There was no evidence that the opening of the liquor store had an effect on the monthly counts of PSRs screened in. Figure 71 shows the predicted vs actual monthly counts for PSRs screened in during the study period.

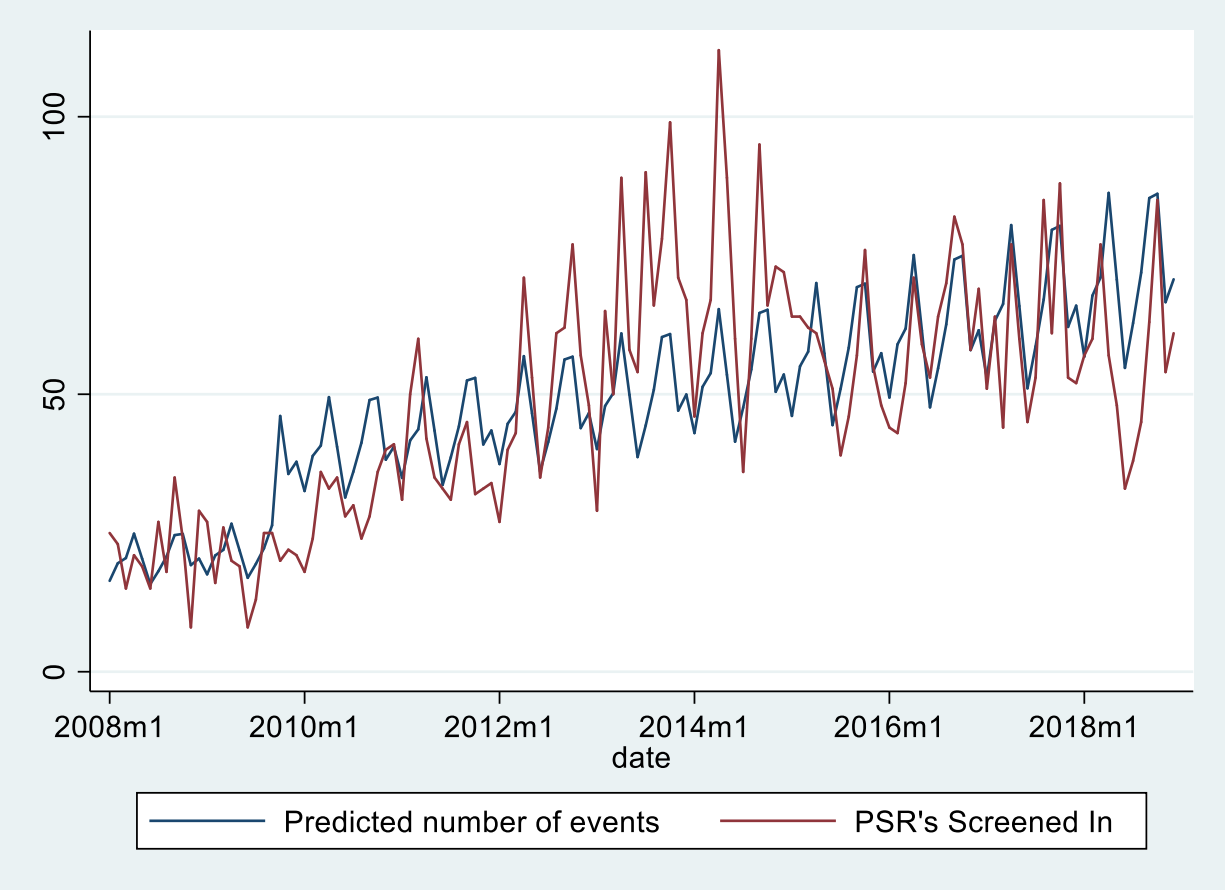

Figure 71 Predicted vs Actual, PSRs screened in

Based on regression analysis, Substantiated Initial Assessment (SIAs) were approximately 70% higher after Bethel left local (beta coefficient = 0.530, p < 0.001). , after adjusting for seasonality. Unlike PSRs received and screened, SIAs did not show a monthly increase over time. Similar to PSRs received and screened, there was not association between SIA volume and the liquor store status. Figure 72 shows the predicted vs actual monthly counts for SIAs during the study period.

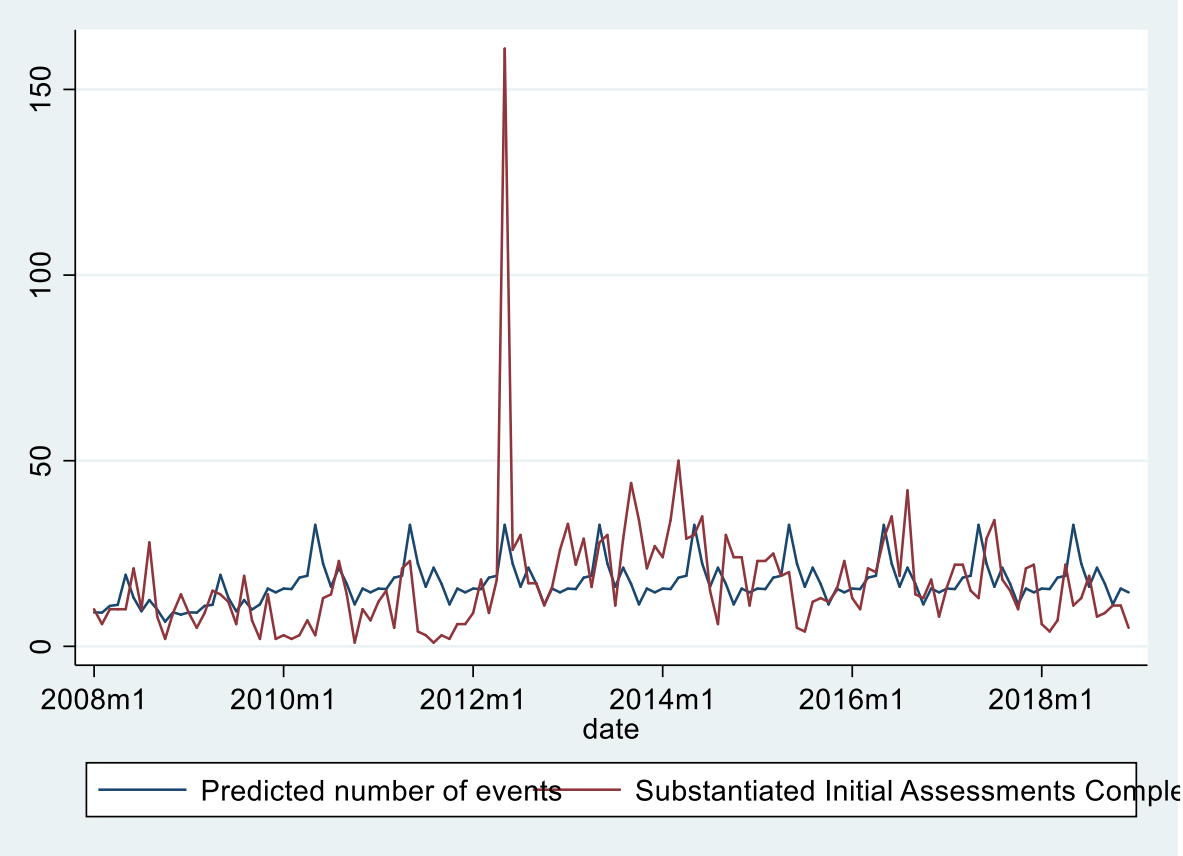

Figure 72 Predicted vs Actual, SIAs completed

Regression analysis suggests that there may be an association between leaving local option and number of children removed from their family, or this association may just be related to a small but steady increase over time. In univariate analyses, leaving local option was associated with a 60% increase in number of children removed (beta coefficient = 0.467, p = 0.016); however, univariate analysis also showed a statistically significant month-to-month increase of approximately 0.4% per month in the number of children removed. However, with both variables in the same model, neither was statistically significant. This suggests that the association between leaving local option and number of children removed may be due to confounding with change over time in number of children removed.

Figure 73 shows predicted vs actual for the univariate regression model where number of children removed is regressed over change in local option status. Figure 74 shows predicted vs

actual for the univariate model where number of children removed is regressed over month-to-month change.

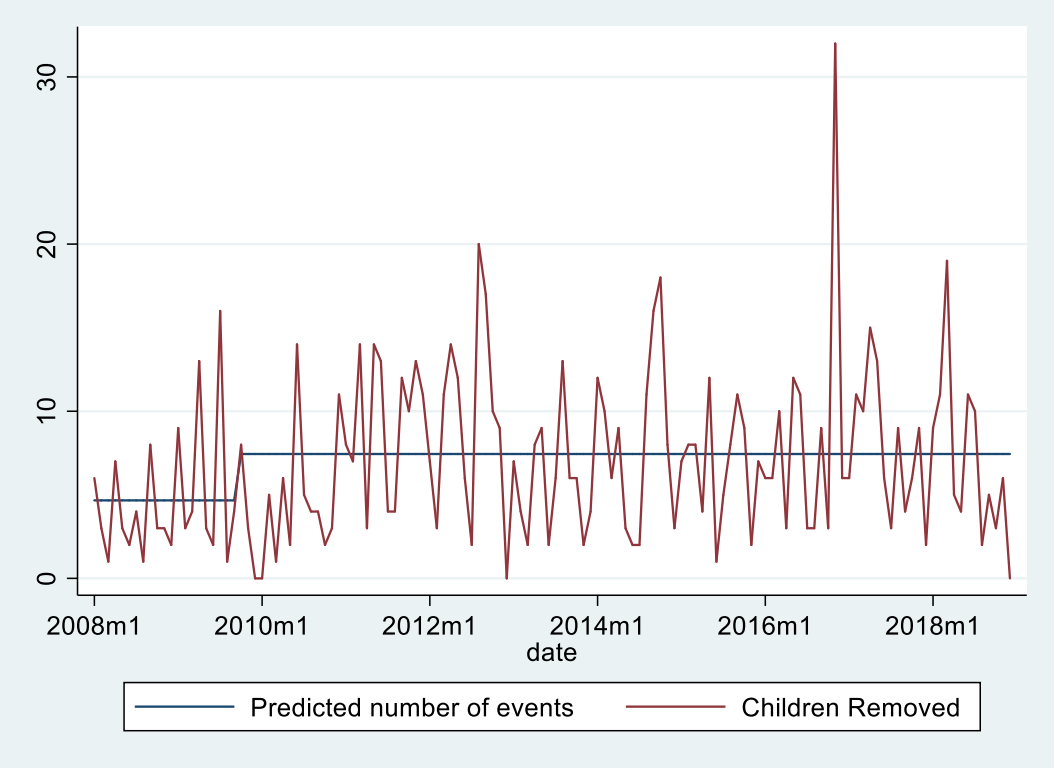

Figure 73 Predicted vs actual, children removed (regressed on local option status)

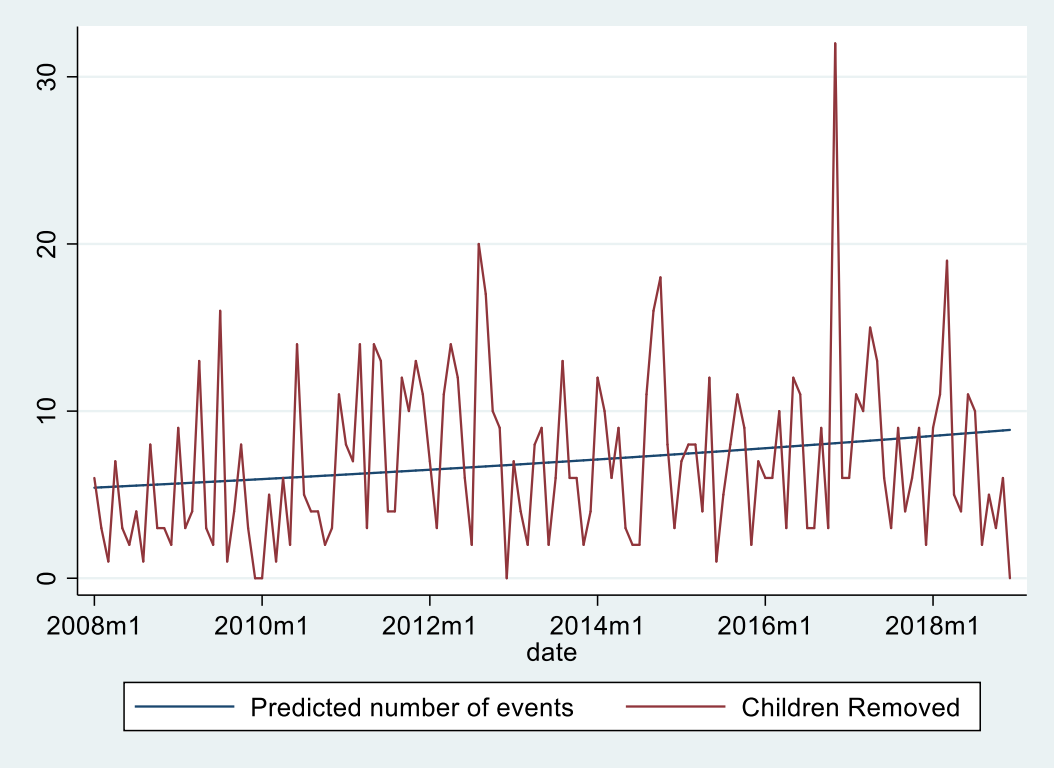

Figure 74 Predicted vs actual, number of children removed (regressed on month)

Regression analysis also shows a small but statistically significant increase over time in the number of children out of home at the end of the month. However, there was no evidence of an association between number of children out of home and either local option status or liquor store status.

OCS Summary

Data from OCS for the Bethel area shows no association between the five OCS measures and the opening or closing of the liquor store; however, PSRs received, PSRs screened in, and SIAs all appeared to be higher after Bethel left local option.

Bethel Search and Rescue, 2011 - 2018

Data

The Bethel Search and Rescue (BSAR) data was recorded on paper forms. As an all-volunteer organization, BSAR does not have the capacity to enter all data into a computer database. The study team collected the BSAR paper forms and extracted key variables into an Excel spreadsheet. The same spreadsheet was delivered to BSAR for their records along with all original paper forms. Any copies were shredded after entry into the spreadsheet. The research team retained a copy of the spreadsheet with no individual identifiers for the use of this evaluation.

Bethel Search and Rescue records spanned from 2011 to 2018. Paper records fell into three main categories: 1) incident diary notebooks, 2) meeting minutes, 3) related Alaska State Trooper reports. Data aggregated into the spreadsheet included the following;

- Start date
- Outcome (e.g. Found safe, Found deceased, Found injured, Not found, etc.)
- Number of persons involved
- Any evidence of the involvement of alcohol
- Number of searchers
- Other organizations involved in the search
- Search origin
- Area of search
- Origin of person(s)
- Destination of person(s)
- Start time of search
- End time of search
- End date
- Other note and details (de-identified)

Some counts of searchers and destinations are marked as estimated in the resulting spreadsheet based on evidence in the paper records.

Results

Search and rescue incident counts ranged from 1 recorded in 2011 to 74 recorded in 2017. A total of 185 individual BSAR entries were compiled involving 39 communities, 84 of which had Bethel as an origin, and 65 of which that listed Bethel as a destination. Eighteen entries did not list an origin and 30 entries did not list a destination.

Records collected in years 2014 to 2018 looked to be most complete when compared to annual summaries. This is likely due to changes in the BSAR administration in 2014 and 2015. Figure 75 shows the total number of searches per year from 2011 through 2018; however, because of

the unconfirmed completeness of the records, no conclusions could be drawn from the BSAR data.

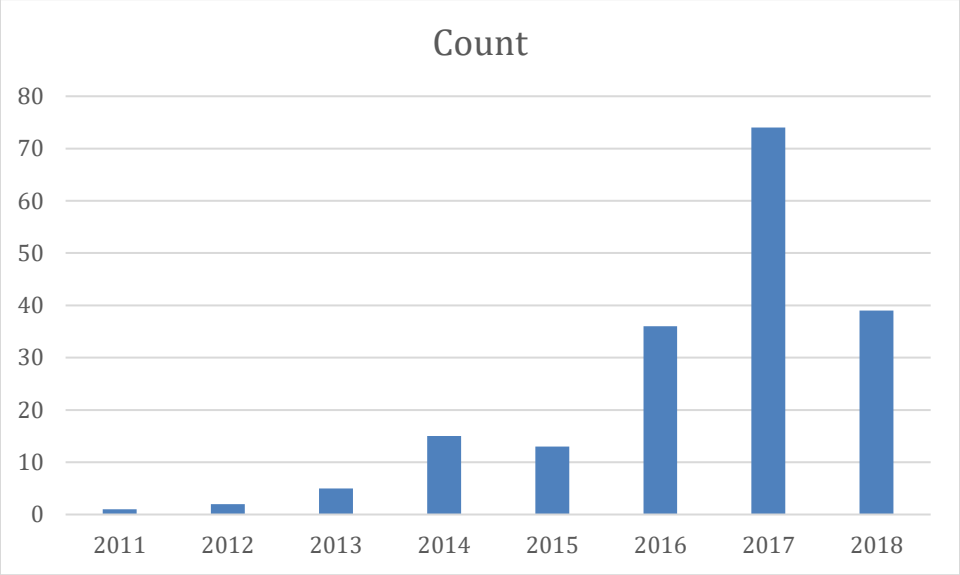

Figure 75 Annual count of searches in BSAR records

Discussion

This retrospective observational study included data from a wide range of health and safety service providers based in Bethel, Alaska. Consistent with many other studies (Jernigan et al, 2000; Nelson, et al, 2013), we found that increased access to alcoholic beverages was associated with increases in demand for safety and health services. Our findings are consistent with what many Bethel residents have reported anecdotally. These results also suggest that at least some residents in Bethel and surrounding communities may experience decreased quality of life when access to alcohol increases.

Study strengths include access to longitudinal data from multiple agencies that provided data on a wide range of outcomes. Consistency across analyses of data from these multiple sources increases confidence in study findings.

Our findings are limited by the data we were able to include in the analyses. Some agencies were only able to provide data for a portion of the time period we were studying. For example, the data from the Alaska State Troopers only covers January 2007 through September 2017 while the data from YKHC only covers 2013 through 2018. More importantly, we did not have access to data related to potential confounders such as agency staffing levels or other events that may have occurred in Bethel or the surrounding area.

An important unmeasured temporal change for these findings may be the opioid crisis that was ongoing during the same timeframe. Between 2010 and 2017, opioid overdose deaths in Alaska increased 77%. (AK DHHS, 2019)

The analysis plan for this project was designed to determine whether there were differences in monthly counts for various health and safety outcomes during pre-specified time periods that corresponded to changes in local option and liquor store status in Bethel. In some cases, the actual increases or decreases appeared to start and end before or after the pre-specified time points. However, in keeping with the analysis plan, we did not conduct exploratory analyses to try to determine where the inflection point occurred for each of the outcomes.

Additional qualitative research may be useful to help better understand the context of these quantitative findings. In addition to better understand what other events occurred during this time period it may be useful to investigate why residents voted to withdraw from local option and whether changes to local option regulations are needed.

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