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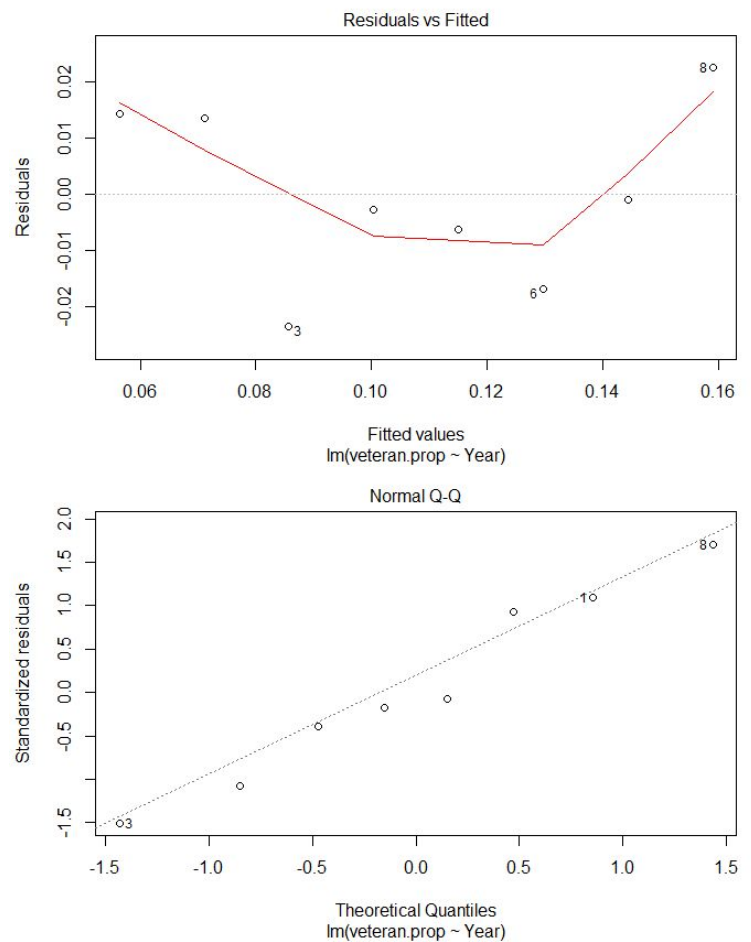
Research Question: Has veteran homelessness in Los Angeles increased from 2007-2018?

Background:

Homelessness in the United States has been prevalent for years and is not ending anytime soon. According to the 2018 Annual Homelessness Report to Congress, an estimate of 553,000 were experiencing homelessness on a given night. When it comes to homelessness, veterans share the same struggle as regular civilians. They must navigate the lack of affordable housing and economic hardship that everyone faces. However, they must face these in addition to the challenges brought on by multiple and extended deployments. Veterans returning from deployments in Afghanistan and Iraq often face invisible wounds of war, including traumatic brain injury and post-traumatic stress disorder, both of which correlate with homelessness.

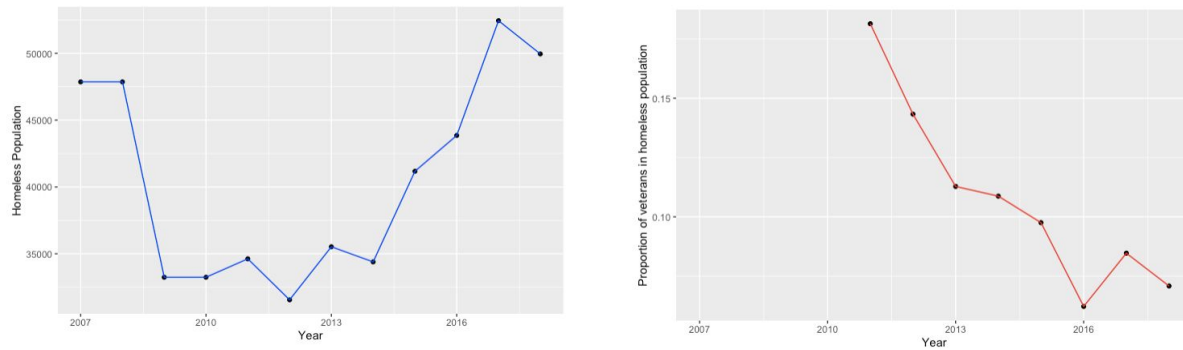
Methods:

We used R to code the graphs below to give visual comparisons we also plotted the Q-Q graph along with the Residuals vs Fitted graph. Using these graphs, we checked the four assumptions. Firstly we check the *normality of residuals* using the Q-Q plot, since we can see that none of the residuals fall too far away from the line, we can confirm the *normality of residuals*. Next we needed to check the linearity however since we didn't have enough observations we were unable to completely confirm linearity but there's also not enough evidence to say the data is not linear. Third, we check that the graph has constant variance, the Residuals vs Fitted graph shows that the variance of the residuals is constant. Lastly, we need to know if our variables are independent which I think it's safe to assume time and homelessness are independent.

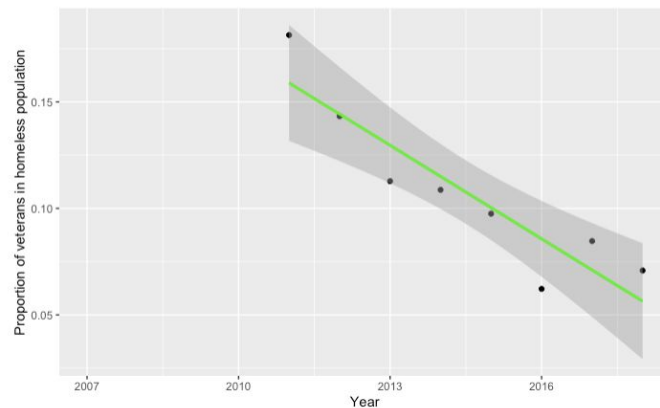


Results/Analysis:

Before conducting the linear model, we wanted to compare the trend of overall homelessness to homeless veterans and look at any interesting patterns.



The graph on the left, in blue, is the trend of overall homelessness from 2007 to 2018, and the graph on the right shows specifically homeless veteran population from 2011 to 2018. Overall homelessness appears to increase overtime whereas homeless veteran population seems to decrease. Due to this significant difference, we thought it was important to keep this information throughout our analysis. We chose to focus specifically on the proportion of veterans in the homelessness population and graph the trend from 2011 to 2018:



The graph portrays each year's veteran to overall homelessness proportion and a linear regression that clearly has a negative slope indicating a decrease in veteran homelessness from 2011 to 2018.

We chose to continue to investigate this correlation with a linear model. Our linear model summary was the following,

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Call:
lm(formula = veteran.prop ~ Year, data = pit.coc)

Residuals:
    Min       1Q   Median       3Q      Max
-0.023506 -0.008929 -0.001915  0.013798  0.022478

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 29.61018    5.35787   5.526  0.00148 **
Year        -0.01464    0.00266  -5.506  0.00151 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.01724 on 6 degrees of freedom
(4 observations deleted due to missingness)
Multiple R-squared:  0.8348,    Adjusted R-squared:  0.8073
F-statistic: 30.32 on 1 and 6 DF,  p-value: 0.001506

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The important values to note from the summary are specifically the coefficient, p-value, and r-squared. The coefficient is -0.01464 indicating a negative correlation and with an increase in each year, there is a decrease by 0.01464 units in the veteran to overall homelessness proportion. Additionally, the p-value is 0.00151 indicating statistical significance and that the decrease over time is significant. Finally, the r-squared value is 0.8348 which is very close to 1, indicating the regression line, $y = -0.01464x + 29.61$, where y is proportion of homeless veterans to overall homelessness in LA and x is years, is a relatively accurate representation of the data. The data analysis strongly suggests a decrease in homeless veterans in proportion to overall homelessness from 2011 to 2018.

Discussion of the research/ limitations of current research:

From the results of our analysis we determined that the decline in the proportion of homeless veterans (HV) among the overall homeless population in Los Angeles between 2011 and 2018 was significant and most likely not just due to chance. Our analysis also identified a particularly noticeable dip in the homeless veteran population in 2016. The proportion dropped from 9.7% in 2015 to 6.2% in 2016. Then it bounced back up a little in 2017 to 8.4%. Even though it came up again, there was still an overall decline despite there being an increase in overall homelessness in the city.

In addition to our statistical analysis we wanted to research this 2016 dip. With just a little research on the internet we found a New York Times article from mid-2016 about the very trend among homeless veterans that we found in our data analysis. According to the article, the downward trend corresponded with increased spending by the country on housing vouchers, called VASH, that combines rental assistance with case management and clinical services.

One of our limitations is the number of data points we had. The Continuum of Care dataset only provided data on homeless veterans between 2011 and 2018, giving us only eight data points to plot and analyze. This is less than ideal, but it is a good starting place for initial observations and research.

We checked the four assumptions of our linear analysis. We confirmed the four assumptions of normality of residuals, linearity, constant variance and independence of variables. This confirmed that the decline we noticed in the proportion of homeless veterans was indeed significant and most likely not due to chance.

Future research could check for similar dips in homeless veterans populations in other cities and check for any correspondence with increased spending on housing vouchers. The connection between the utilization of housing vouchers and declines in homelessness rates could be applied to the other homeless populations in Los Angeles, like unsheltered youth.

References:

<https://endhomelessness.org/homelessness-in-america/who-experiences-homelessness/veterans/>