

# Lab\_04

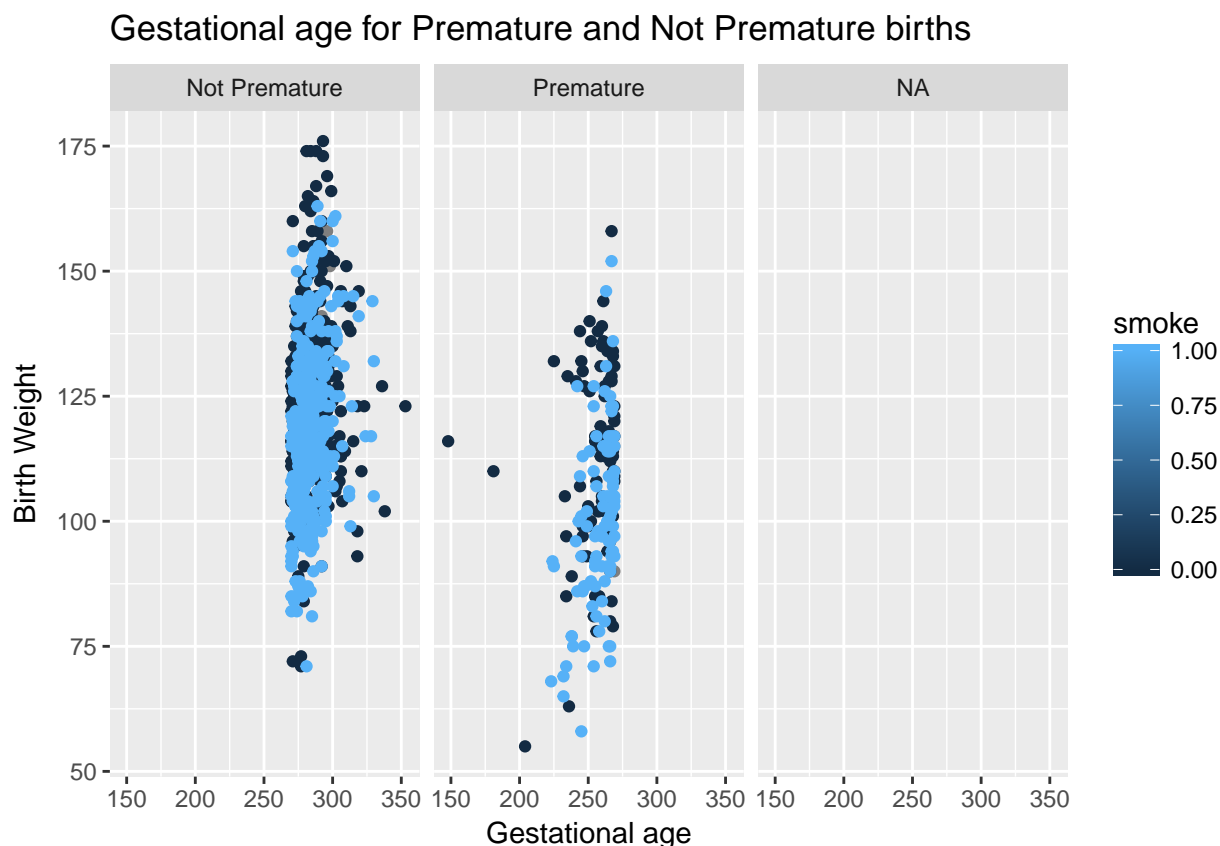
## Fantastic Four

### Does smoking lead to babies born prematurely?

This is significant because premature babies are at risk to many health issues at birth as well as throughout their childhood and lives. If there is a correlation between a mother's smoking habits and the probability of their child being born prematurely in order to prevent newborn health issues mothers should be educated about smoking while pregnant.

### Overall Findings

```
PLabel<-c('0'="Not Premature", '1'="Premature")
ggplot(data= babies, mapping= aes(x=gestation, y= bwtoz)) + geom_point(aes(color= smoke))+facet_wrap(~PLabel)
```



This graph shows more smokers give birth to premature babies than non smokers. This prematurity leads to a lower weight for the baby, creating health issues down the road for the babies. Nonsmokers who carry their baby the full term record a higher weight at birth. This goes along with the other data we have found in the individual sections below.

## Conclusion

Our overall plots shows that smoking will cause premature. Babies were born to mothers who smoked have more chances to be premature. Therefore, we can support the view cited in the Surgeon General's Report (1989) that is "Mothers who smoke have increased rates of premature delivery (before 270 days). There could be a few variables which also affect premature, such as the mother's age, smoking frequency, and number of previous pregnancies. While there are some confounding variable such as pre-pregnancy weight, the plot indeed shows a correlation between whether smoke or not and rates of premature delivery.

## Does smoking lead to babies with low birth weight?

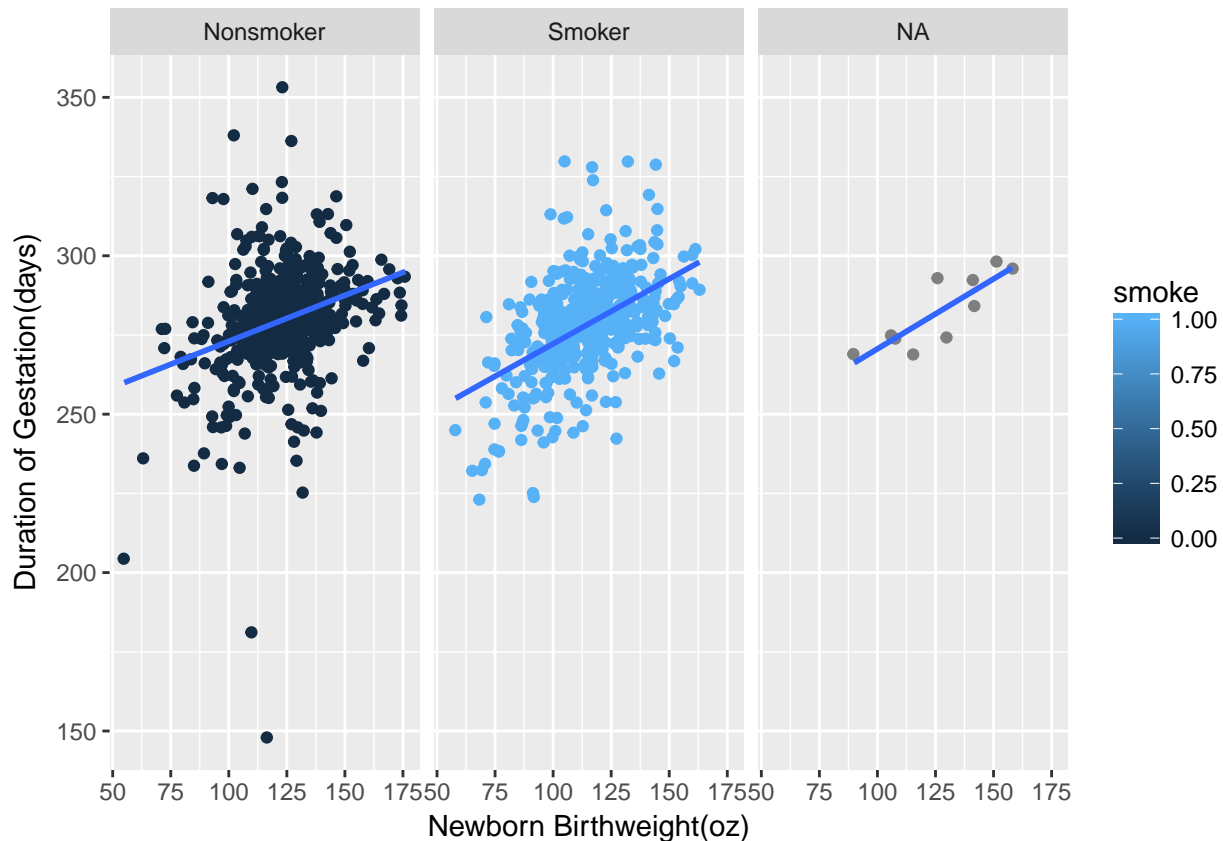
Similarly to prematurely born babies, babies born at lower weights are also more likely to face general health, growth and development. Analysis of a mother's smoking habits and their baby's birth weight could reveal if smoking causes low birth weight. Any findings can then be used to encourage mothers not to smoke during pregnancy and increase the likelihood of having a healthy child.

## Overall Findings

There is a negative relationship between smoking and newborn birth weight. Mothers that smoked during pregnancy had children which weighed less than mothers that did not. Newborns born from smoking mothers were born with an average weight from 115-120 ounces, whereas, newborns with nonsmoking mothers were born weighing an average of 125-130 ounces. There was also a wider distribution of weights, with most babies weight less than the average, for mothers which smoked. this demonstrates the connection between a mother's smoking habits during gestation and the weight of their newborn.

## Conclusion

```
newLabel<-c('0'="Nonsmoker", '1'="Smoker")
ggplot(data=babies) + geom_jitter(mapping=aes(x=bwtoz, y=gestation, color=smoke)) + facet_wrap(~smoke, .
```



The graph above plots the newborn birth weight and the gestation period before birth, the multiple plots separate the data according to smoking and nonsmoking mothers. There is a wider distribution of newborn weights and gestation for children of smokers, but, there is a higher density corresponding to lighter weights and shorter pregnancy. Therefore, most premature and low weight babies are born from mothers which smoked. The data illustrates that smoking does lead to premature and low birth weight of newborns. Children born to mothers which smoked were more frequently born premature and at a below average weight. Therefore, smoking during pregnancy has negative effects on the developing fetus and can cause difficulties at birth, which in turn can also cause health issues in the child's life later on. There could be other variables which also affect premature and underweight births, such as the mother's health and age, the father's health, however, the data presents a strong correlation between smoking and childbirth.

## Recommendation

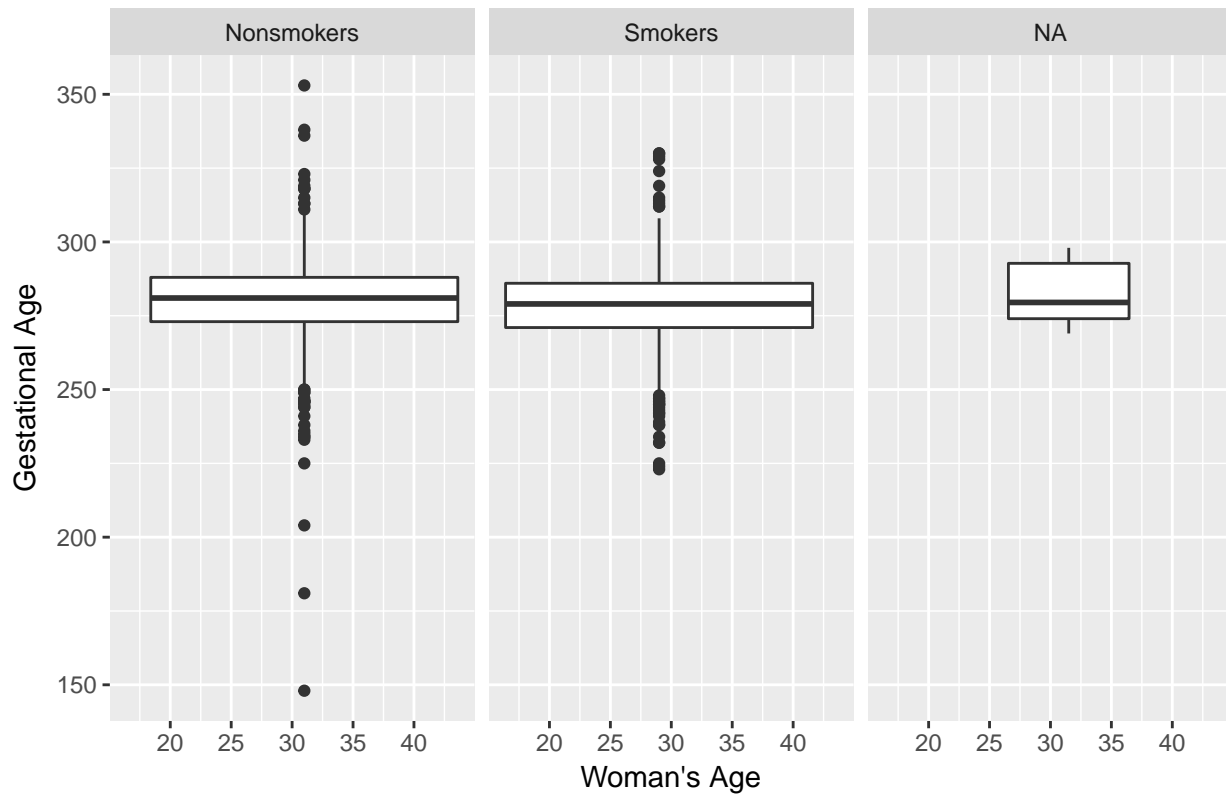
In order to decrease the amount of premature and under weight babies, mother's should be discouraged from smoking during pregnancy and even before becoming pregnant. Expectant mothers need to be educated on the negative consequences of smoking throughout a pregnancy.

## Individual Findings

Lexie Marinelli

```
newLabel<-c('0'="Nonsmokers", '1'="Smokers")
ggplot(data= babies)+ geom_boxplot(mapping= aes(x=mage, y=gestation)) +facet_wrap(~smoke, labeller= lab
```

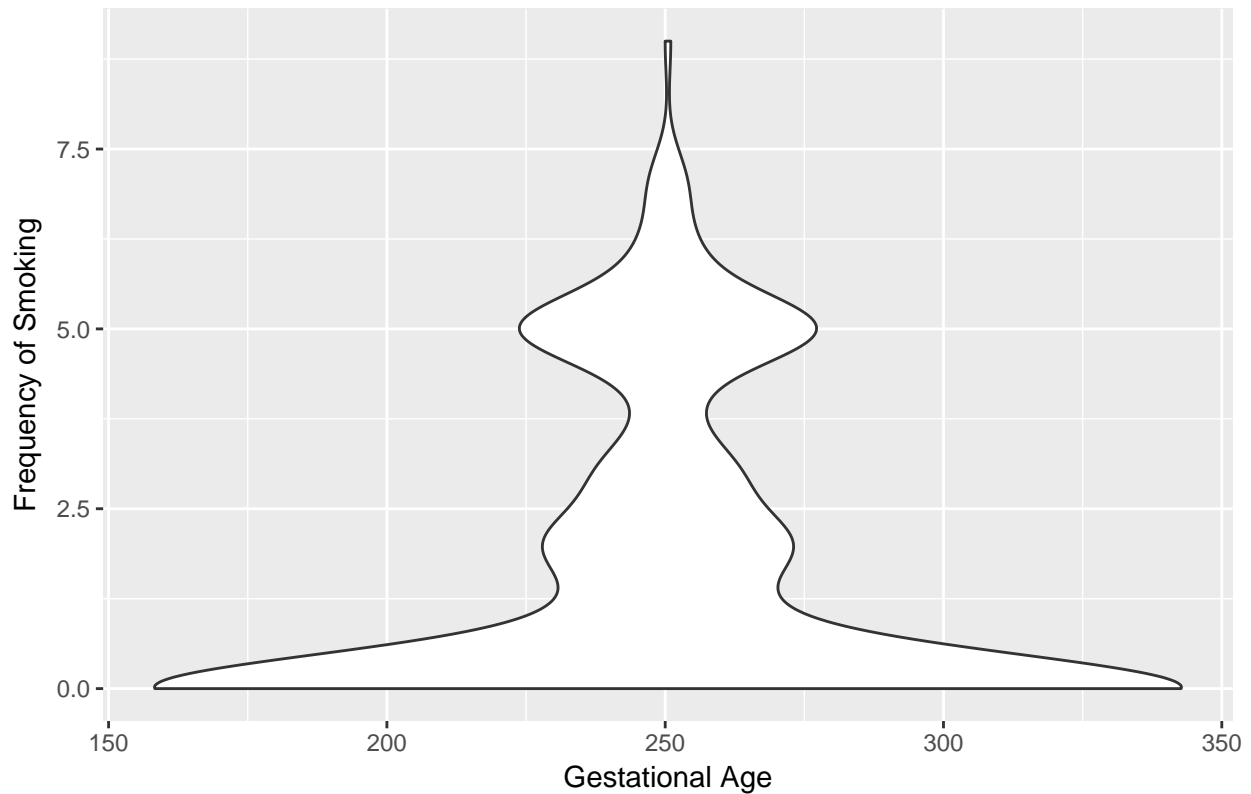
## Age of Woman vs. Gestational age of Smokers and Nonsmokers



This graph shows that on average the most women who smoke are younger than those who don't, with an average gestational age slightly below women who do not smoke. On paper this doesn't seem as important, but as the gestational age of the baby gets younger, the chance for survival is decreased.

```
ggplot( data= babies) + geom_violin(mapping= aes(x= gestation, y=number), scale= "area") +ggtitle(label
```

## Gestational Age vs. Frequency of Smoking

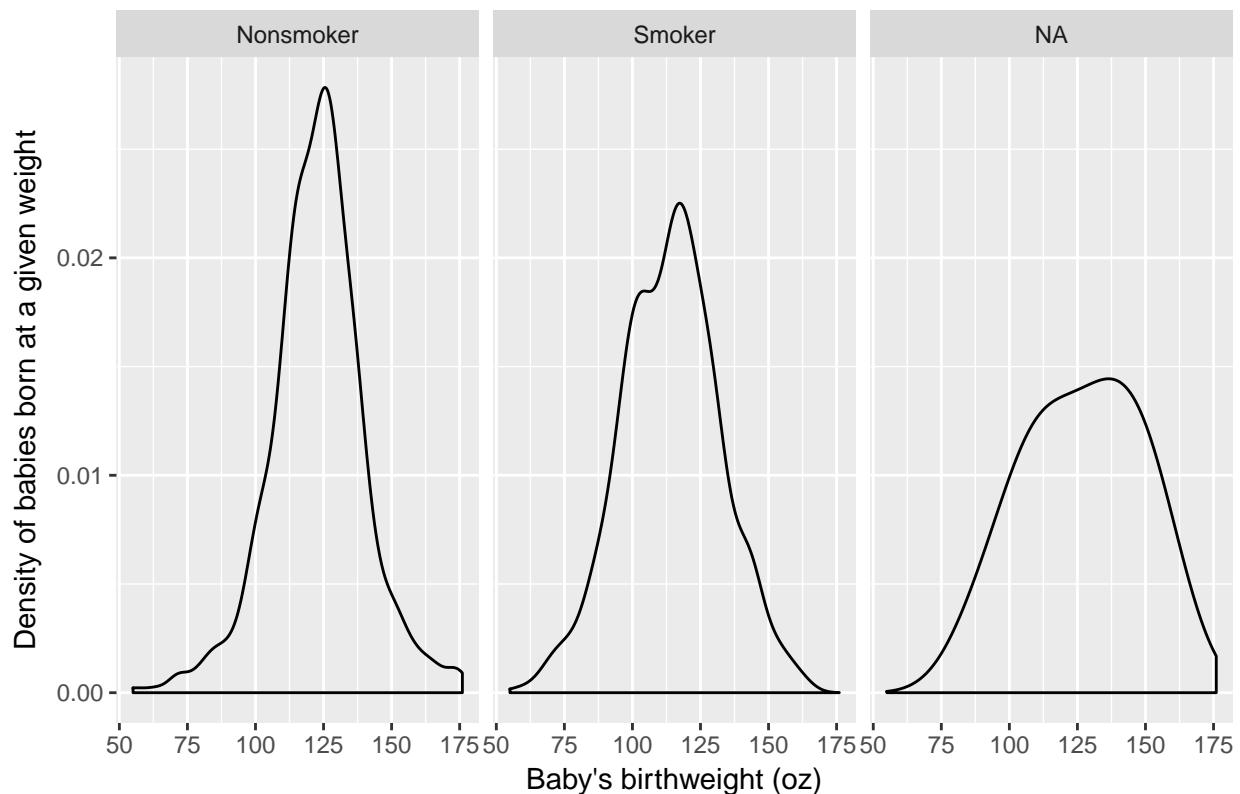


The second graph accounts for women who have smoked more frequently. It shows that women who have smoked more than 15+ cigarettes a day (past or present) increase their chances significantly of having a premature baby at the gestational age of 250. As the number of cigarettes smoked in a day increases, the chance of getting a premature baby largely increases.

Lindsay Gettel

```
slabel<-c('0'="Nonsmoker", '1'="Smoker", 'N/A'="Previous Smoker")
ggplot(data=babies) +geom_density(mapping=aes(x=bwtoz)) +facet_wrap(~smoke, labeller=labeller(smoke=slabel))
```

## Baby's birthweight comparison of smoker and nonsmoker mothers

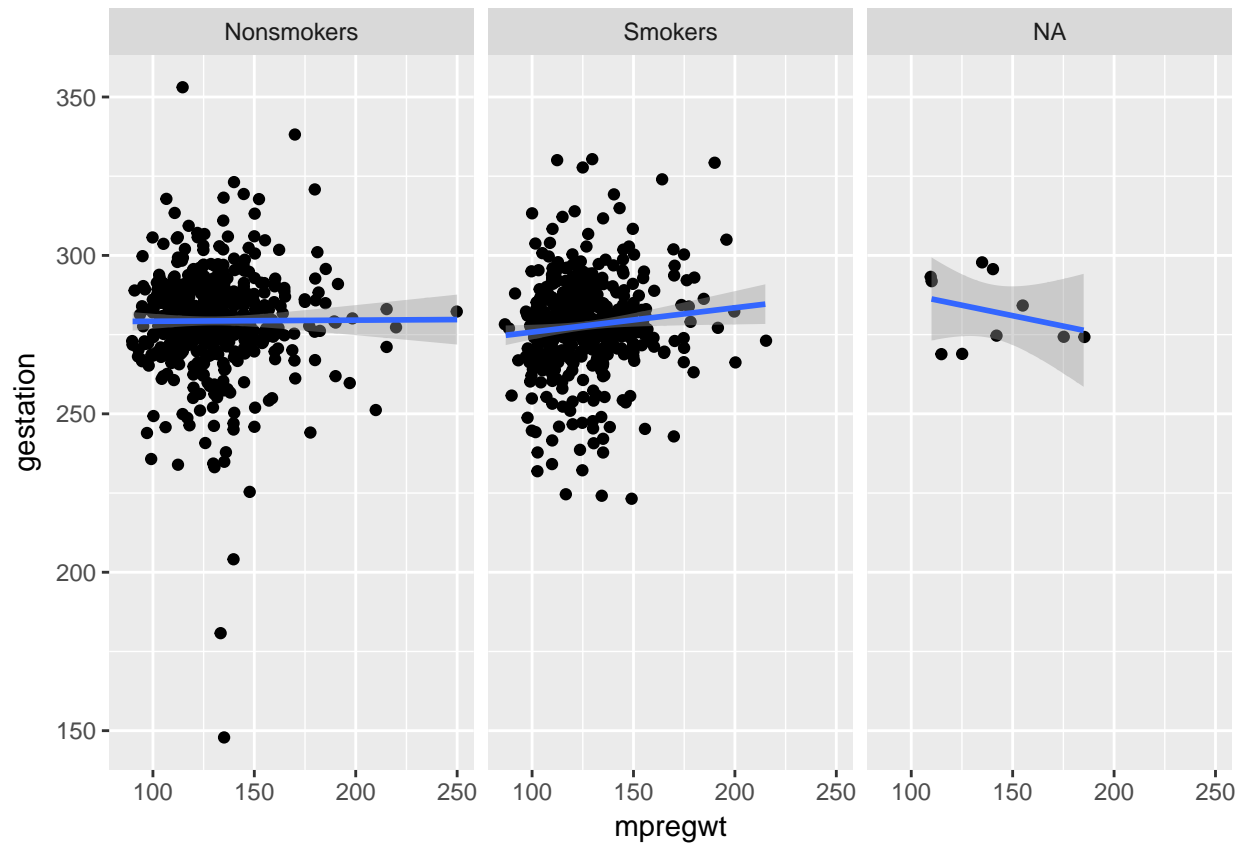


The graph above demonstrates the correlation between smoker, and nonsmoker mothers with the birth weight of their babies. The graphs illustrate that smoker mothers on average had children born lighter, in a range of 110-125oz. In contrast, nonsmoking mothers gave birth to children weighing between 125-130oz. The “N/A” plot is representative of mothers which quit smoking, and there is a wider distribution of birth weights, however, most children were born around 130oz, this could account for mothers which smoked until pregnancy or quit during pregnancy, so the child was still affected and born weighing less than average.

## Zhenlong Li

For the first plot, I found that smokers' babies have more chances to be premature than nonsmokers', but there are some outliers in nonsmokers' babies. I think it may related to other confounding factors such as age, race and etc. There is barely nothing relation between pre-pregnancy weight and gestational age.

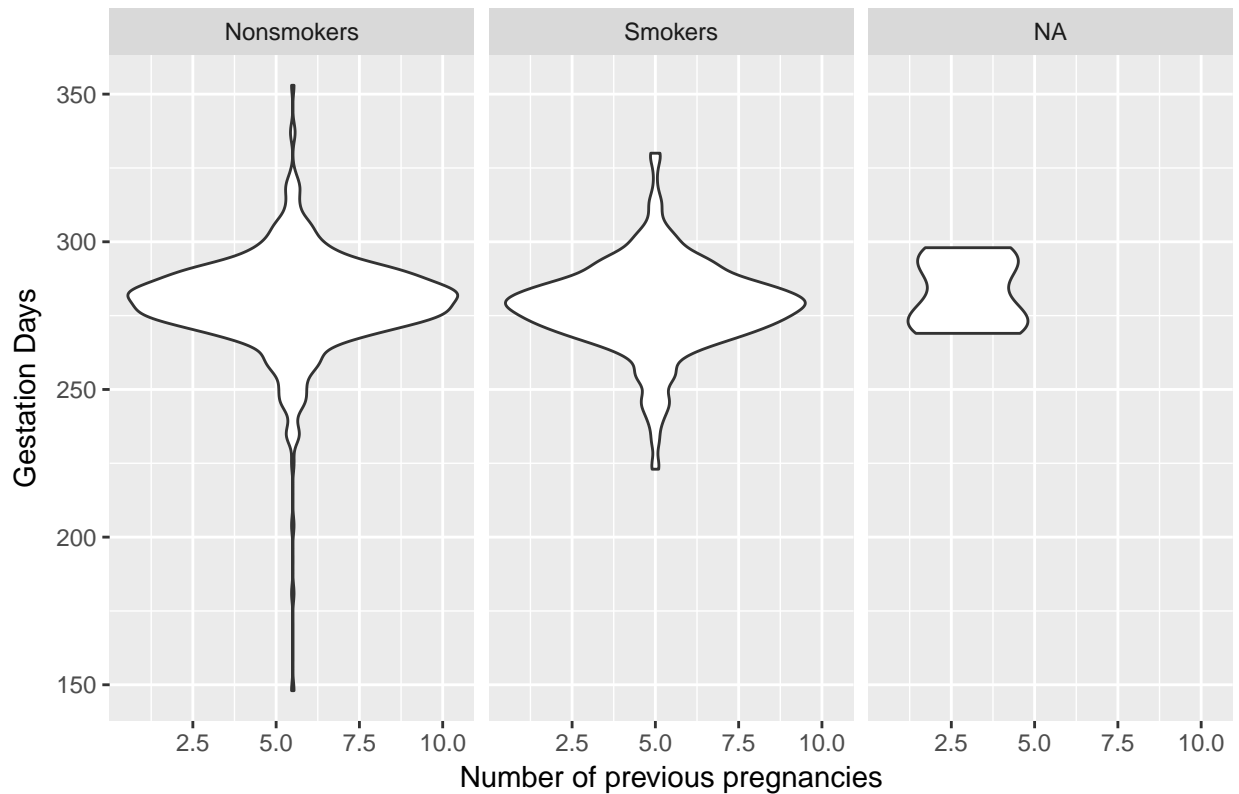
```
ggplot(data= babies,mapping= aes(x= mprewt , y= gestation))+ geom_jitter() + geom_smooth(method = "lm").
```



For second one, I found that there are more smokers' babies were born before gestational age of 270 according to the two violin plots, while the gestation I think it may related to the total numbers of previous pregnancies including fetal deaths and still births. The more parity, the more premature babies.

```
newLabel<-c('0'="Nonsmokers", '1'="Smokers")
ggplot( data = babies, mapping= aes(x= parity , y= gestation)) + geom_violin(scale = "area") +facet_wrap
```

## Parity vs. Baby's Gestation between Smokers and Nonsmokers

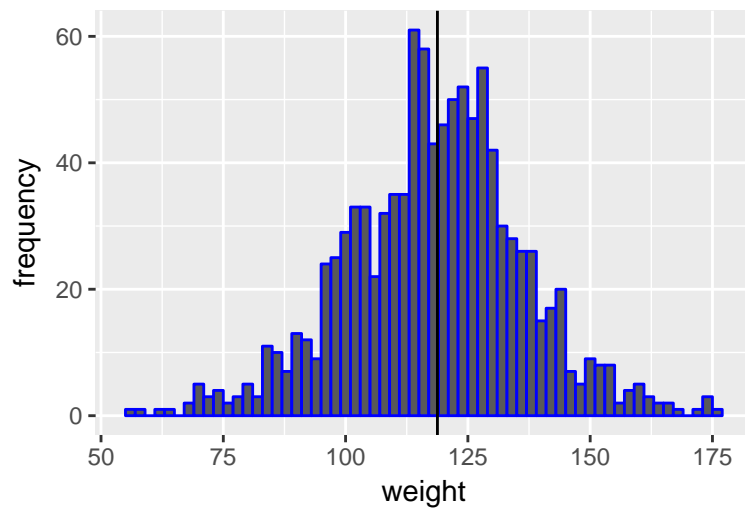


## Scott Baker

The first two plots here just show distributions of baby weight and gestation. These were mostly to see if the data was generally about normal when looking at the relationship between smoking and birth weight.

```
ggplot(data=babies, aes(bwtoz)) + geom_histogram(color = "blue", binwidth = 2) + geom_vline(aes(xintercept = 1.04))
```

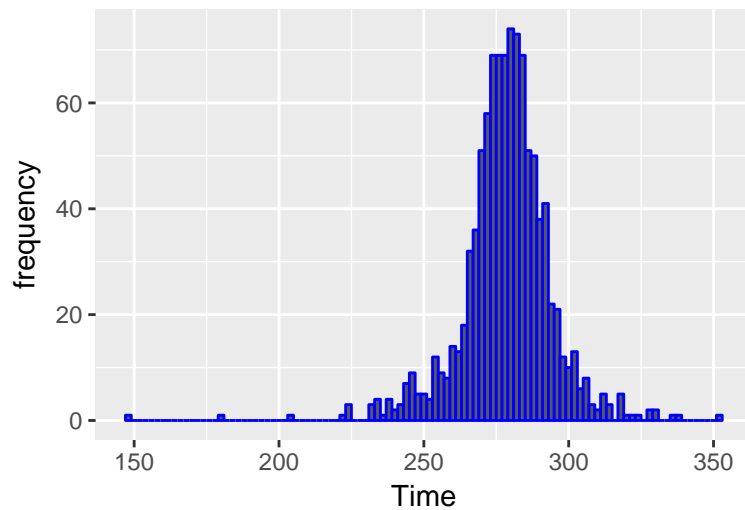
## Distribution of weight





```
ggplot(data=babies, aes(gestation)) + geom_histogram(color = "blue",binwidth = 2) + geom_vline(aes(xint=
```

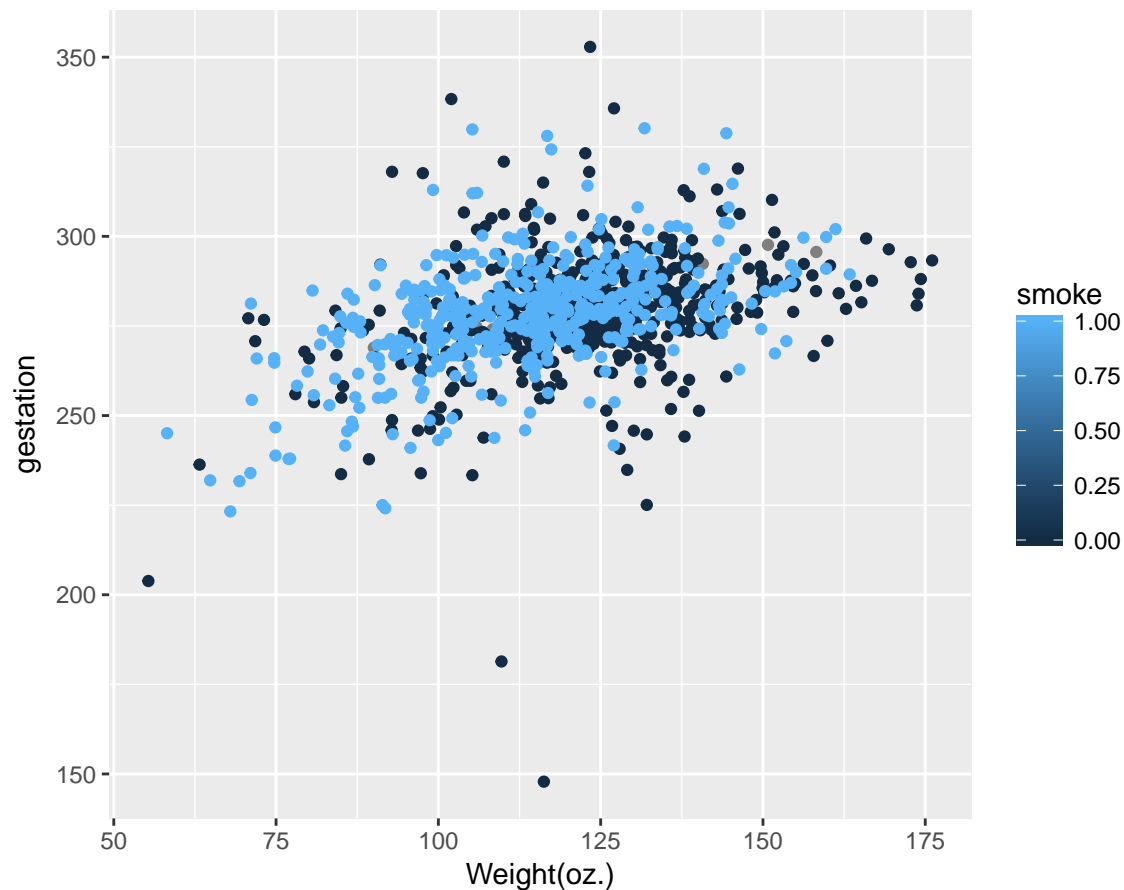
Distribution of gestation



This next plot is used to help explain that there is no apparent relationship between the mother smoking and both birth weight and gestation:

```
ggplot(data = babies, mapping = aes(x = bwtoz,y=gestation,color=smoke)) + geom_jitter() + ggtitle(label
```

Comparing weight to gestation with visualization of smoking



## Contributions

- Lindsay: I created a density graph to analyze the frequency of weights of newborns, using `geom_density`. I then used `facet_grid` to display the data according to smokers and nonsmokers in order to see a side by side comparison. I also contributed to the question significance, general findings, conclusion write up and graph.
- Lexie: I created my individual plots along with the conclusion graph and description. I contributed to the recommendation as well.
- Li: I made two plots, one is showing the how mothers' pre-pregnancy weights affected premature by using `geom_point` and `geom_smooth` to show the relationship between pre-pregnancy weights and gestational ages. Then, I used `facet_grid` to divide into smokers and non smokers. Another plot is showing how parity affected premature by using `geom_violin` to show mean of gestational age and `facet_grid` to divide into smokers and non smokers. I wrote conclusion of our first guiding questions.
- Scott: I added info on the correlation between smoking and weight. Also, organized the git.