In [1]:

```
# To import the required libraries
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import tweepy
import csv
import string
import re
import nltk
#nltk.download('vader_lexicon')

from textblob import TextBlob
from nltk.sentiment.vader import SentimentIntensityAnalyzer
from wordcloud import WordCloud, STOPWORDS
from PIL import Image
```

In [2]:

```
#Twitter Authentication
consumerKey = "VqSDkT8l1yUclHfKEHjo6bYpk"
consumerSecret = "qM4lMUsuzlhXGAreyhPyEgin4rHOduAuT3MJGkxMulquIz5zmX"
accessToken = "1275263936590479360-jQRiw2U5dCZ5saB1AJzlE64uwHeL1x"
accessTokenSecret = "ncYLGFI3n7JKbWssLIVj7tehJVDW1oDAxR6BX7y9xTKll"

auth = tweepy.OAuthHandler(consumerKey, consumerSecret)
auth.set_access_token(accessToken, accessTokenSecret)
api = tweepy.API(auth)
```

In [3]:

```
#Functions to extract tweets and calculate percentage
def extract_tweets(hashtags, numTweets):
    data = tweepy.Cursor(api.search_tweets, q=hashtags, lang="en").items(numTweets)
    return data

def percent(actual,total):
    return 100 * float(actual)/float(total)
```

In [4]:

```
#Most common hashtags relevant to our topic ('Roe V Wade')
hashtags = "#RoeVWade OR #RoeVsWade OR #Roe_v_Wade OR #RoeOverturned OR #RoeVWadeOverturned OR #RoeVersusWade OR #ProLife
numTweets = 3200

#Function Call to extract tweets based on the hashtags
```

```
tweets = extract_tweets(hashtags, numTweets)

#Variables to store positive, negative and neutral tweets and the corresponding count of tweets
pos  = 0
pos_list = []
neg = 0
neg_list = []
neut = 0
neut_list = []
polarity = 0
tw_list = []
```

In [5]:

```
#To analyze the tweets using SentimentIntensityAnalyzer
#and assign the tweets to appropriate categories based on the polarity scores
#Also to write the tweets to a csv file
csvFile = open('RoeVWade_Overturned_Tweets', 'a')
csvWriter = csv.writer(csvFile)

for tweet in tweets:
    csvWriter.writerow([tweet.created_at, tweet.text.encode('utf-8')])
    tw_list.append(tweet.text)
    analysis = TextBlob(tweet.text)
    score = SentimentIntensityAnalyzer().polarity_scores(tweet.text)
    negative = score['neg']
    neutral = score['neu']
    positive = score['pos']
    comp = score['compound']
    polarity += analysis.sentiment.polarity

    if negative > positive:
        neg_list.append(tweet.text)
        neg += 1

    elif positive > negative:
        pos_list.append(tweet.text)
        pos += 1

    elif positive == negative:
        neut_list.append(tweet.text)
        neut += 1
csvFile.close()
```

In [6]:

```
#To find the number of tweets reflecting each sentiment
#and to calculate the percentage of positive, negative and neutral tweets
pos = percent(pos, numTweets)
neg = percent(neg, numTweets)
neut = percent(neut, numTweets)
polarity = percent(polarity, numTweets)
pos = format(pos, '.1f')
neg = format(neg, '.1f')
neut = format(neut, '.1f')

tw_list = pd.DataFrame(tw_list)
neut_list = pd.DataFrame(neut_list)
neg_list = pd.DataFrame(neg_list)
pos_list = pd.DataFrame(pos_list)
print("Total Number of tweets: ",len(tw_list))
print("Positive Tweets: ",len(pos_list))
print("Negative Tweets: ", len(neg_list))
print("Neutral Tweets: ",len(neut_list))
```

```
Total Number of tweets:  1242
Positive Tweets:  509
Negative Tweets:  385
Neutral Tweets:  348
```

In [7]:

```
#To remove duplicate tweets and extract the text of the unique ones
tw_list.drop_duplicates(inplace = True)
tweets_list = pd.DataFrame(tw_list)
tweets_list['text'] = tweets_list[0]

#Removing RT, Punctuation and hash
remove_rt = lambda x: re.sub('RT @\w+: ',' ',x)
rt = lambda x: re.sub('(#[A-Za-z0-9]+)|(@[0-9A-Za-z \t])(\w+:\/\/\S+)',' ',x)
tweets_list['text'] = tweets_list.text.map(remove_rt).map(rt)
tweets_list['text'] = tweets_list.text.str.lower()
tweets_list.head(10)
```

Out[7]:

	0	text
0	RT @SaMor97691348: IF YOU ARE #ProChoice\nIF Y...	if you are \nif you want to \nif you agree ...
1	This is powerful. Please share!\n#prolifemyass...	this is powerful. please share!\n \n \nhtt...
2	RT @Springfield_Lab: @carolewilliams @sartain_...	@carolewilliams @sartain_stephen well done @h...
3	Follow @votelandsman #OH1\n\nIF YOU ARE #ProC...	follow @votelandsman 1\n\nif you are \nif y...

	0	text
4	RT @Nishaobgyn: A much belated &amp; very welc...	a much belated &amp; very welcome change to ...
5	RT @FreeIsMe3: Lyrics I put down due to the na...	lyrics i put down due to the nature of the wa...
7	IF YOU ARE #ProChoice\nIF YOU WANT TO #CodifyR...	if you are \nif you want to \nif you agree ...
9	RT @David_Leavitt: Guns have more rights than ...	guns have more rights than women\n\n htt...
10	Check out Stacey Smith's video! #TikTok https:...	check out stacey smith's video! https://t.co...
11	RT @lisasmithreed: There is an undeniable war ...	there is an undeniable war on women. this is...

In [8]:

```
#Calculating Negative, Positive, Neutral and Compound values

tweets_list[['polarity', 'subjectivity']] = tweets_list['text'].apply(lambda Text: pd.Series(TextBlob(Text).sentiment))
for index, row in tweets_list['text'].iteritems():
    score = SentimentIntensityAnalyzer().polarity_scores(row)
    negative = score['neg']
    neutral = score['neu']
    positive = score['pos']
    comp = score['compound']
    if negative > positive:
        tweets_list.loc[index, 'sentiment'] = "negative"
    elif positive > negative:
        tweets_list.loc[index, 'sentiment'] = "positive"
    else:
        tweets_list.loc[index, 'sentiment'] = "neutral"
    tweets_list.loc[index, 'neg'] = negative
    tweets_list.loc[index, 'neu'] = neutral
    tweets_list.loc[index, 'pos'] = positive
    tweets_list.loc[index, 'compound'] = comp

#Print the first 10 records in the tweets_list table
tweets_list.head(10)
```

Out[8]:

	0	text	polarity	subjectivity	sentiment	neg	neu	pos	compound
0	RT @SaMor97691348: IF YOU ARE #ProChoice\nIF Y...	if you are \nif you want to \nif you agree ...	0.000000	0.000000	positive	0.000	0.743	0.257	0.4215
1	This is powerful. Please share!\n#prolifemyass...	this is powerful. please share!\n \n \nhtt...	0.375000	1.000000	positive	0.000	0.283	0.717	0.7644

	0	text	polarity	subjectivity	sentiment	neg	neu	pos	compound
2	RT @Springfield_Lab: @carolewilliams @sartain_...	@carolewilliams @sartain_stephen well done @h...	0.000000	0.750000	positive	0.000	0.618	0.382	0.7003
3	Follow @votelandsman #OH1\n\nIF YOU ARE #ProC...	follow @votelandsman 1\n\nif you are \nif y...	0.000000	0.000000	positive	0.000	0.787	0.213	0.4215
4	RT @Nishaobgyn: A much belated &amp; very welc...	a much belated &amp; very welcome change to ...	0.600000	0.600000	positive	0.000	0.838	0.162	0.5095
5	RT @FreeIsMe3: Lyrics I put down due to the na...	lyrics i put down due to the nature of the wa...	0.163889	0.402778	positive	0.000	0.617	0.383	0.9081
7	IF YOU ARE #ProChoice\nIF YOU WANT TO #CodifyR...	if you are \nif you want to \nif you agree ...	0.000000	0.000000	positive	0.000	0.759	0.241	0.4215
9	RT @David_Leavitt: Guns have more rights than ...	guns have more rights than women\n\n htt...	0.500000	0.500000	neutral	0.000	1.000	0.000	0.0000
10	Check out Stacey Smith's video! #TikTok https:...	check out stacey smith's video! https://t.co...	0.000000	0.000000	neutral	0.000	1.000	0.000	0.0000
11	RT @lisasmithreed: There is an undeniable war ...	there is an undeniable war on women. this is...	0.500000	0.500000	negative	0.365	0.635	0.000	-0.7845

In [9]:

```
#Creating new data frames for all sentiments (positive, negative and neutral)

negative_tweets = tweets_list[tweets_list["sentiment"]=="negative"]
positive_tweets = tweets_list[tweets_list["sentiment"]=="positive"]
neutral_tweets = tweets_list[tweets_list["sentiment"]=="neutral"]
```

In [10]:

```
#Function to output count and percentage of tweets corresponding to each sentiment

def count_sentiment(data,feature):
    total=data.loc[:,feature].value_counts(dropna=False)
    percentage=round(data.loc[:,feature].value_counts(dropna=False,normalize=True)*100,2)
    return pd.concat([total,percentage],axis=1,keys=['Total','Percentage'])
```

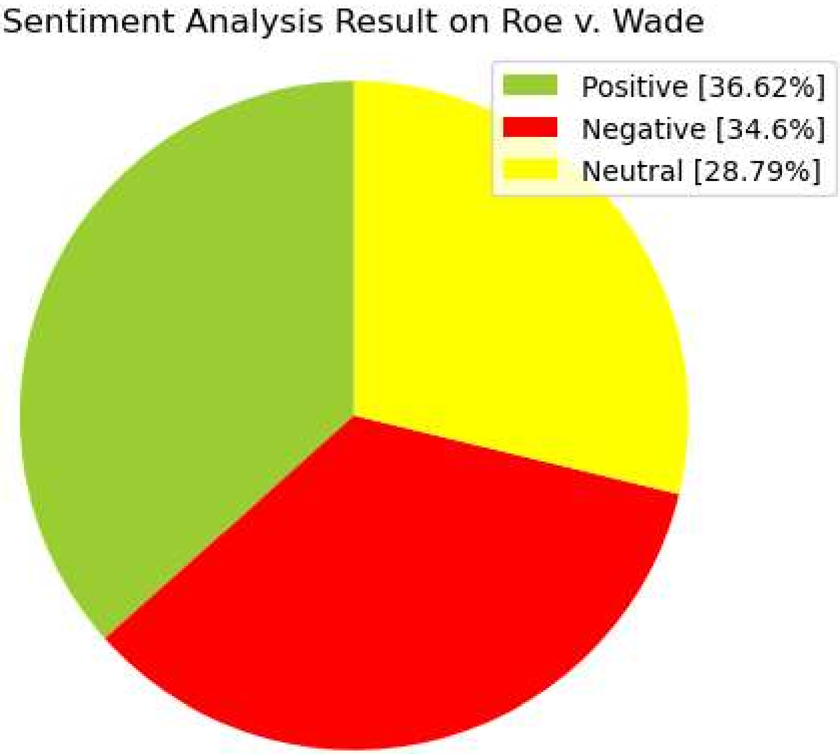
In [17]:

```
#Print the count of tweets for each sentiment
#and a pie chart representing the distribution of tweets with different sentiments

print(count_sentiment(tweets_list,"sentiment"))
```

```python
sentiment_split = count_sentiment(tweets_list,"sentiment")
pie_data = pd.DataFrame(sentiment_split)
sizes = [pie_data.iloc[0][1], pie_data.iloc[1][1], pie_data.iloc[2][1]]
colors = ['yellowgreen', 'red', 'yellow']
patches, texts = plt.pie(sizes,colors=colors, startangle=90)
labels = ['Positive ['+str(pie_data.iloc[0][1])+'%]' , 'Negative ['+str(pie_data.iloc[1][1])+'%]','Neutral ['+str(pie_dat
plt.style.use('default')
plt.legend(labels)
plt.title("Sentiment Analysis Result on Roe v. Wade" )
plt.axis('equal')
plt.show()
```

```
          Total  Percentage
negative    290       36.62
positive    274       34.60
neutral     228       28.79
```



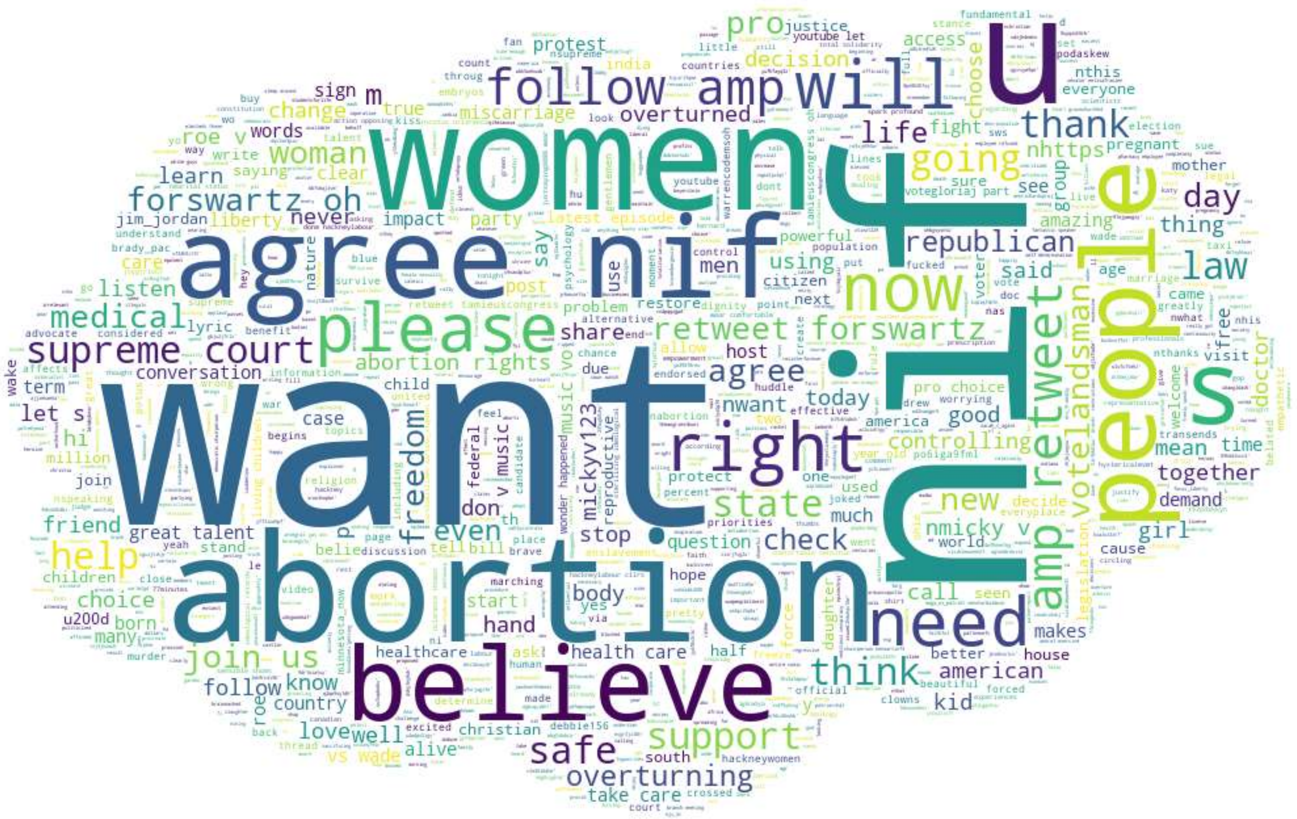
In [18]:

```python
#Function Definition for creating and printing Wordcloud
```

```
def print_wordcloud(text):
    mask = np.array(Image.open("wordcloud.png"))
    STOPWORDS.update(["https", "co", "n", "t"])
    stopwords = set(STOPWORDS)
    wc = WordCloud(background_color="white",
                   mask = mask,
                   max_words=2000,
                   stopwords=stopwords,
                   repeat=True)
    wc.generate(str(text))
    wc.to_file("wc.png")
    path="wc.png"
    display(Image.open(path))
```

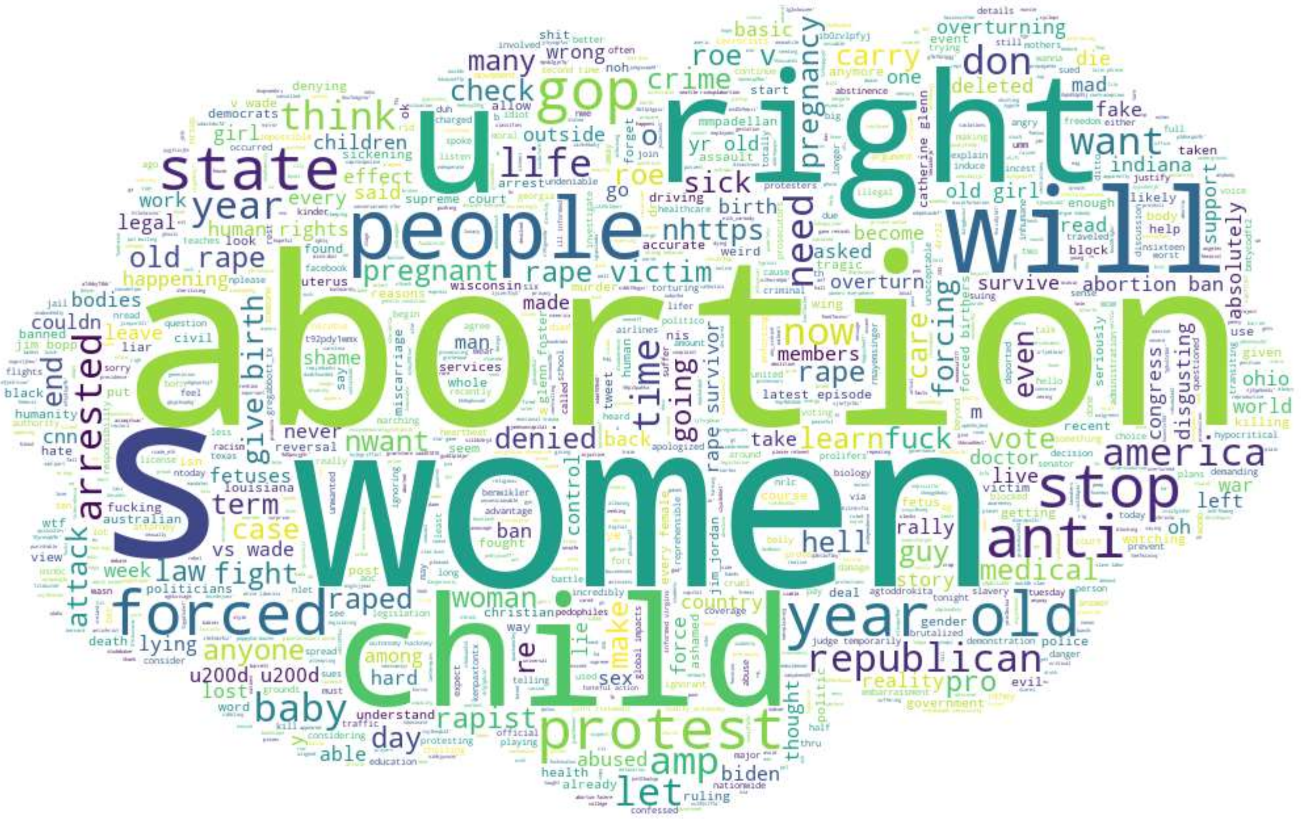
In [19]:

```
#Function call to print wordcloud for positive sentiment
print_wordcloud(positive_tweets["text"].values)
```

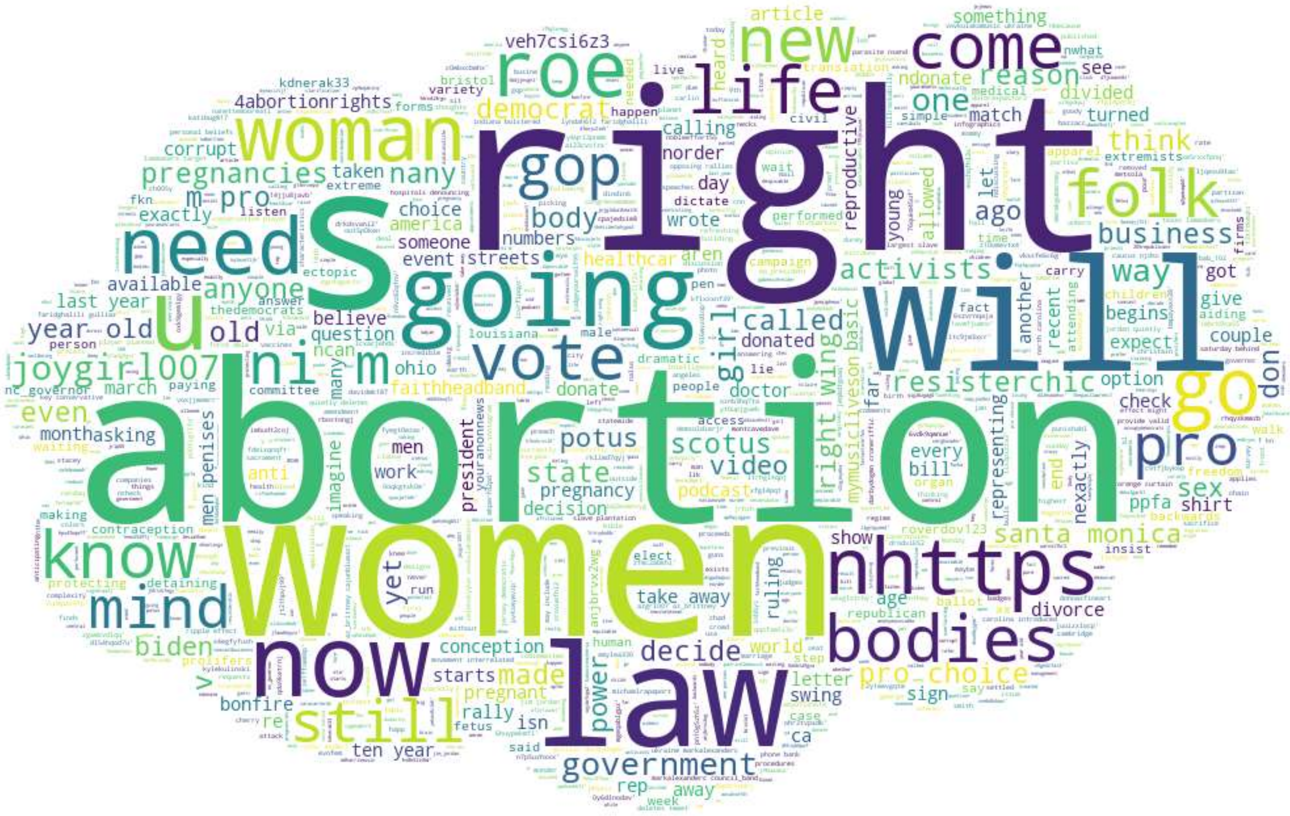


In [20]:

```
#Function call to print wordcloud for negative sentiment
print_wordcloud(negative_tweets["text"].values)
```



```
In [21]:  #Function call to print wordcloud for neutral sentiment
           print_wordcloud(neutral_tweets["text"].values)
```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activists
way
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year
last year
called
girl
right wing
resisterchic
santa monica
sex
ppfa
pro choice
decide
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starts
bonfire
rally
pregnant
isn
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away
swing
sign
letter
case
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world
take away
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republican
divorce
age
show
roverdov123
podcast
decision
pregnancy
imagine
men
anti
work
president
believe
ohio
faithheadband
donate
doctor
donated
reproductive
mymusicliveson
basic
far
every
bill
representing
nexactly
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option
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kdnerak33
veh7csi6z3
bristol
variety
forms
happen
live
civil
ndonate
match
turned
divided
medical
nwhat
something
article
translation
available
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march
paying
committee
men
contraception
detaining
protecting
prolifers
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fkn
republican
ballot
organ
performed
campaign
fact
carry
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insist
shirt
backwards
freedom
walk
aiding
apparel
extremists
firms
dramatic
people
access
lie
pen
elect
human
step
week
said
fetus
ten year
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v
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answer
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